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UNITED
STATES
CRYPTOLOGIC
HISTORY

4

Technical Research Ships

1956—1969

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UNITED STATES CRYPTOLOGIC HISTORY

Special Series
Number 2

TECHNICAL RESEARCH SHIPS

1956—1969

An Historical Study

George F. Howe

Foreword

The record of the Technical Research Ships is an important chapter in U.S. cryptologic history. These seaborne Sigint platforms made unique and highly valuable contributions, posed unusual management and control problems, and were caught in tragic international incidents that hastened the abandonment of the program.

It is most appropriate that one of the first volumes of the official published history should be one that had been prepared by the former chief of the history program shortly before he retired.

Vincent J. Wilson, Jr.
Chief, Cryptologic History Program

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(b)(3) - P.L. 86-36
(b)(3)-50 USC 3024(i)

Introduction

This history is concerned with operations conducted by NAVSECGRU and other Sigint personnel aboard United States ships—personnel that had as their primary mission to perform Sigint operations in response to national Sigint requirements; ships that were dedicated wholly to Sigint operations. Those ships were converted transport hulls of types known during World War II as "Liberty" or "Victory" ships. Although this history pays attention to the possibility of replacing or supplementing them by smaller ships of the type called for a time "trawlers," the central subject is United States experience with two kinds of Technical Research Ships (TRSs) in service from 1961 to 1969. One set were commissioned in the U.S. Navy; the other chartered in the Military Sea Transportation Service.

From 1956 to 1961 the concept of a TRS advanced to actuality. Beginning in 1961 the successful outcome of early operations caused requirements for the use of seaborne platforms on national Sigint missions to multiply. For the first time Sigint pertaining to many parts of Latin America and Africa could be produced. At the same time political ferment in both continents made that Sigint highly prized. The TRSs contributed also to collecting signals related to Soviet earth-satellite vehicle (ESV) flights, space probes and missile tests, and to [redacted] The TRSs helped other ships engaged in that work and in turn were helped by them.

Both types of TRS (AGTR and T-AG) were converted ships. Before a newly constructed ship originally designed to serve as a Sigint platform could be begun, and while the TRSs of both types were approaching the end of serviceability, smaller vessels (AGERs) claimed attention, since it was thought that they might be able to satisfy requirements and might cost less to build and operate.

One AGTR and one AGER encountered violent attacks while they were in international waters. On 8 June 1967, *Liberty* was badly damaged in the eastern Mediterranean. On 23 January 1968, *Pueblo* was seized in the Sea of Japan, and taken with its ship's company into the North Korean port of Wonsan. These episodes caused restraints on the future operations of other Sigint ships: they had to stay so far from shore that certain types of signals were inaudible, and even there they had to move under protective escort.

Navy Sigint operations at sea treated here do not include such important forms as those of the regular NAVSECGRUDETs afloat, engaged, as primary mission, in direct support of Fleet or Force commanding officers, or of the special Sigint units temporarily embarked on destroyers or ships of other types during patrols or cruises of opportunity. The focus is on the TRS.

At first the TRS was tested to ascertain whether it could perform as acceptably in practice as it could in theory. While it was passing that test, urgent new Sigint requirements were levied on DIRNSA, requirements that could be met only by collection aboard seaborne platforms. As the TRSs revealed their potentialities, they invited wider and more systematic coverage to acquire a technical base essential to Sigint readiness in sudden critical episodes. As they showed deficiencies, corrective measures were planned and, in the newer TRSs, were worked into the original configuration of equipment and arrangements for work. Much thought was given to the characteristics of a ship to be constructed eventually from the keel up for Sigint operations only.

The mounting costs of building and operating ships discouraged attempts to acquire new Technical Research Ships or AGERs. During 1969, when the Navy had to strike many ships from the active list (Project 703), a choice had to be made between combat ships and intelligence ships. All the Technical Research Ships and all AGERs were eliminated by the end of that year.

This history attempts to show to what degree the management of the TRSs followed a general pattern. So many entities, cryptologic and noncryptologic, participated in policy decisions, military command and control (including protection), logistic support, cryptologic operational and technical control (including missions and tasks), and provided secure telecommunications (by means not treated here in detail) that the necessary coordination was extensive and complex.

The author has received aid from many persons and in particular from officers at Headquarters, NAVSECGRU, and from the former K Group.

TABLE NO. 1

INTERCEPT POSITIONS, OFFICERS, AND ENLISTED MEN AVAILABLE FOR PRIMARY SHIPBOARD SIGINT TASKING, CALENDAR YEARS 1961 TO 1969

	1961	1962	1963	1964	1965	1966	1967	1968	1969
U.S.S. *Oxford* (USN–850)									
Intercept Positions		21	24	22	22	22	22	23	23
Sigint Personnel	1/24	9/114	6/106	6/110	6/110	6/110	6/119	6/118	6/128
Ship's Crew		9/140	10/147	10/167	9/151	9/151	9/151	9/151	9/151
U.S.N.S. *Valdez* (USN–851)									
Intercept Positions		19	22	22	22	21	19	20	20
Sigint Personnel		4/86	4/91	3/93	4/91	4/91	4/97	4/89	5/98
Ship's Crew (Civilians)		13/29	13/29	13/29	13/29	13/29	13/29	13/29	13/29
U.S.S. *Georgetown* (USN–852)									
Intercept Positions				24	24	23	23	21	21
Sigint				6/130	6/137	6/137	6/134	6/134	6/133
Ship's Crew				10/168	9/151	9/151	9/151	9/151	9/151
U.S. *Jamestown* (USN–853)									
Intercept Positions				24	24	24	23	23	23
Sigint Personnel				6/130	6/137	6/137	6/141	6/134	6/155
Ship's Crew				10/176	10/176	9/151	9/151	9/151	9/151
U.S.S. *Belmont* (USN–854)									
Intercept Positions					21	20	20	19	21
Sigint Personnel					6/128	6–128	6/125	6/124	6/126
Ship's Crew					9/151	9/151	9/151	9/151	9/151
U.S.S. *Liberty* (USN–855)									
Intercept Positions					21	21	20		
Sigint Personnel					6/128	6/128	6/125	2/23	
Ship's Crew					9/151	9/151	9/151		
U.S.N.S. *Muller* (USN–856)									
Intercept Positions			21	18	18	18	18	18	19
Sigint Personnel			3/49	4/90	4/90	4/90	4/89	5/93	6/93
Ship's Crew (Civilians)			11/48	11/48	11/48	11/48	11/48	11/48	11/48
Total Installed Positions		40	67	110	152	149	145	124	125
Total NAVSECGRU Personnel	1/24	13/200	13/246	25/553	38/821	38/821	38/830	35/715	34/733
Other Navy Personnel		9/140	10/147	30/511	46/780	45/755	45/755	36/604	36/604

TABLE NO. 2

PERSONNEL DISTRIBUTION BY FUNCTIONS

Illustrative of the distribution of personnel among shipboard functions is the following table taken from programming documents:

Shipboard Unit	*Functions*	*Total FY67*	*Total FY68*
U.S.S. *Oxford* (U.S.N. 850)	Collection	61	54
	Processing	26	26
	Maintenance	13	14
	Communications	14	18
	Other	172	172
U.S.N.S. *Valdez* (U.S.N. 851)	Collection	57	42
	Processing	9	15
	Maintenance	7	8
	Communications	6	13
	Other Military	16	15
U.S.S. *Georgetown* (U.S.N. 852)	Collection	75	70
	Processing	23	23
	Maintenance	16	17
	Communications	14	18
	Other	172	172
U.S.S. *Jamestown* (U.S.N. 853)	Collection	81	64
	Processing	25	25
	Maintenance	16	17
	Communications	14	22
	Other	172	172
U.S.S. *Belmont* (U.S.S. 854)	Collection	66	60
	Processing	23	23
	Maintenance	16	17
	Communications	14	18
	Other	172	172
U.S.S. *Liberty* (U.S.N. 855)	Collection	69	
	Processing	20	
	Maintenance	16	
	Communications	14	
	Other	172	
U.S.N.S. *Muller* (U.S.N. 856)	Collection	42	42
	Processing	17	17
	Maintenance	9	10
	Communications	10	14
	Other Military	16	15

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Chapter I
Responding to Early Requirements

Origins of the Technical Research Ships (TRS)

In the fifties, when the U.S. Sigint effort began expanding to satisfy increasing requirements of national intelligence, each Service constructed several collection stations at ground sites in occupied or friendly countries. Fixed sites were found to need reinforcement by mobile platforms. Vans on the ground, aircraft configured with special gear, and ships at sea were utilized.

The Director, NSA, included shipboard intercept positions in the Intercept Deployment Plans of the 1950s, but the Navy never used a whole ship, not even during World War II, for which the primary mission was Sigint production. The incentives for trying a seaborne "platform" were great. They were thought to have important advantages.

A shipboard collection platform might be more tenable in the long run than a land-based site. The Sigint posture of the United States in several countries could be adversely affected by bitter disputes among them, controversies in which a carefully neutral attitude by the United States would be strongly resented by both parties. In 1964, for example, Turkey and Greece were aroused by the events on Cyprus. [redacted] the pressure to demilitarize landholdings obliged the United States to relinquish Sigint station sites, first by consolidating at a few, and next by withdrawal. Even in other friendly countries, if ardent nationalists opposed a U.S. military presence—and this U.S. presence could not be shown to serve the clear and immediate advantage of the host country—demands on their government by these nationalists could lead to a choice by U.S. Sigint authorities between downgrading or terminating operations.

Another example is the lull in the "Cold War" that occurred in the late 1960s, and the corresponding decline in the vitality of the North Atlantic Treaty Organization. As a consequence, General Charles de Gaulle at the head of the French government successfully pushed all non-French military organizations out of that country, and U.S. fixed Sigint stations in [redacted] necessarily had to be considered as "exposed" sites.

A shipboard platform operating in international waters not only avoided many such hazards but also might be activated and ready in less time than some ground stations. To areas that suddenly acquired a pressing collection priority it could be deployed more speedily. If a fixed station lost effectiveness when the targets it had been covering shifted from hearable signals to low-powered VHF or microwave transmissions, a shipboard platform could often move without delay to points where the new signals might be intercepted. Even while a ground site was being acquired and an installation was being constructed, a shipboard platform could engage in search and development. It might thus accumulate an adequate technical base and train operators in order to facilitate speedy success when the new fixed station began its collection activities.

Ideas of that sort were to be tested pragmatically as soon as the U.S. Navy had a Technical Research Ship. The train of events which brought that about in 1961 originated in 1956. In view of threatening indications of impending crisis in the Middle East, DIRNSA then officially asked that the Navy acquire a ship able to serve in the Eastern Mediterranean as a shipboard collection platform. The vessel would be expected to navigate in international waters between Cyprus and Port Said. He sought information concerning the choice of ship, costs of conversion, estimated costs of operation, and nature of any problems (other than diplomatic) that the Navy anticipated.

NSA's inquiry met with favorable attention in the Office of the Chief of Naval Operations (OP-03), and discussions through the summer brought about successively more substantial concepts.

The Naval Security Group in 1956 concluded that it could best produce a seaborne intercept platform by converting a World War II merchant cargo vessel, a "Liberty ship"[1]; many lay at anchor, "mothballed" in reserve. Conversion would be economical. Existing operating capabilities—sea-keeping, speed, endurance, power plant, ship control arrangements, and protection (except for radio-active materials)—would be sufficient. Damage control facilities would need to be raised to the Navy's standards for commissioned ships. The hull would have to be divided into at least two compartments and properly ballasted to trim. The all-important mounting of antennas and installation of electronic equipment systems would be the most substantial changes. Next to that in importance would be the suppression of electro-magnetic noise from sources (including radars) aboard ship.

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[1] The Liberty-type was a standardized vessel of about 10,000 tons cargo capacity powered by reciprocating steam engines, and able at most to make 11 knots. More than 2,700 were constructed in U.S. shipyards from 1940 to 1945.

Quarters for a ship's crew of 3 officers and 127 enlisted men, including 12 CPOs, and for a Naval Security Group "Research Operations Department" consisting of 10 officers and 125 enlisted men, including 14 CPOs, would be constructed to provide comfort and habitability appropriate for unusually long periods at sea.

Sigint operations would be conducted in forward and aft sections, each of which would be further subdivided, thus providing separate spaces for intercept positions, general and Sigint communications, analytic processing, repair shops, storage of spare parts, photographic laboratory, power supply, and administration.

Communications facilities would provide reliable single-channel radioprinter and Morse communications up to 1200 miles. By 1962, the specifications had been raised to provide four-channel multiplex radioprinter, plus a two-channel system providing either printer or Morse with a range of at least 2,000 miles for use by the Research Department.

The configuration of shipboard Sigint collection systems combined six kinds of equipment—antennas, radio-frequency (RF) distribution, receivers, magnetic tape recorders, demultiplexers and terminals, and direction finders. Mounting the antennas to minimize distortion from the superstructure was imperative. One dipole antenna covered VLF/LF/MF/HF transmissions from 1 to 30 MHz. For VHF, one omnidirectional antenna and one directional antenna served two frequency bands, and a third antenna served two other bands. For microwave signals there were three kinds: horns, an S-Band tracker for each telemetry position, and a high-gain antenna for each position or each pair of positions. The HFDF position used another antenna.

The ship's own communications also required antennas. From 1966 on, when the TRS Special Communication System (TRSSCOM) was installed, it included a large adjustable dish. The prominence of the antenna array obliged resort to a cover story that included research in radio-wave propagation as well as in hydrographic and oceanographic phenomena. To get the best service from a ship's antenna array, preamplifiers and multi-couplers formed an RF distribution portion of the system.

Three kinds of radio receivers—scanning, targeted, and general purpose—were mounted in various ways at intercept positions, and some had magnetic tape recorders (of which there were three varieties in use). Demultiplexers and terminal equipment varied widely among the different Technical Research Ships.

When automatic Morse intercept positions were found unnecessary, the later TRSs were not so equipped. On the larger vessels, the intercom system was inadequate for dispersed operating spaces and not sufficiently flexible. The WLR-1 electronic countermeasures equipment and the associated preamplifiers and RF distribution often gave trouble.

The Bureau of Ships estimated in 1958 that converting a Liberty ship into a Navy shipborne collection platform would cost about $4.5 million. That figure was based on assumptions that the work would resemble that of modifying a Liberty to serve as a radar picket ship (YAGR), and would be performed at a shipyard already familiar with the task. The bureau concluded that the whole process of conversion and establishing readiness for operations would take 11 or 12 months after funds were made available. The annual cost of upkeep and maintenance was estimated at $295,000.

An effort to respond to NSA's proposal of 28 June 1956 with supplemental funds for use during fiscal year 1959 failed. Conversion of one ship was then included in the Navy's Ship Building and Conversion Program for FY60, at an estimated cost of $6 million. A shipborne Sigint collection platform was to be known officially as a "Technical Research Ship (AG)," abbreviated as "TRS."

Nomenclature

The term, Technical Research Ship (TRS), was applied initially only to a ship of the U.S. Navy wholly manned by Navy personnel. The construction and interior sub-division of such ships were controlled by Navy standards of strength, safety, and habitability. Lengths of cruises, times in port, and scheduled shipyard overhauls were governed by Navy policies. The ships were under military operational control of the Navy.

Another kind of shipboard Sigint collection platform was partly manned by NAVSECGRU personnel (the "Military Department"), and partly by a civilian master and operating crew. Such ships were chartered by NSA and operated by the Military Sea Transportation Service (MSTS), a component of the Navy which

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was managed separately and differently from the others. The ships were smaller coastal transports. Its policies concerning lengths of cruises, times in port and shipyard, accommodations for personnel and other matters resembled those of the U.S. maritime service rather than the regular Navy. A distinction between the two types was reflected in their respective designations as "U.S.S." and "U.S.N.S." Eventually both types were grouped during budget and programming actions as Technical Research Ships.

The Navy placed all its vessels in classes according to function. Before 1964, Technical Research Ships were assigned to an auxiliary miscellaneous class (AG). In March 1964 the Chief, Bureau of Ships, reclassified them from AG to AGTR (Auxiliary General Technical Research) and changed the hull numbers from AG-159, 165, 166, 167 and 168 to AGTR-1, 2, 3, 4, 5, respectively. Thus U.S.S. *Oxford*, first identified as AG-159, became AGTR-1. On MSTS-chartered ships the hull number was preceded by the letter "T". The U.S.N.S. *Valdez* (T-APC 119) was the first of them to be chartered as a TRS. It became T-AG-169.

The Sigint collection performed aboard any type of vessel qualified the Sigint unit as a "station" to which NSA allocated a national identifying symbol [redacted] [redacted] *Oxford* thus carried U.S.N.—850; *Valdez*, U.S.N.-851.[2]

U.S.S. Oxford Begins Service, September 1961

On 26 September 1961, U.S.S. *Oxford*, first of the Technical Research Ships, left Norfolk and headed for Guantanamo Bay and the Caribbean. She was beginning a cruise of 44 days for training and "shakedown." CDR Howard R. Lund commanded the ship, subordinate to the Commander, Service Force Atlantic Fleet. The authorized billets for 18 officers and 254 enlisted men were almost equally divided between general service personnel and the cryptologic specialists of the "Research Operations Department." The latter were under LCDR A. J. Hughes. While under the ship's Commanding Officer, he was also responsible to the Director, NAVSECGRU, through whom the Director, NSA, exercised operational and technical control.

Oxford (as the former U.S.S. *Samuel Aitken*) had been towed during the previous October from the Wil-

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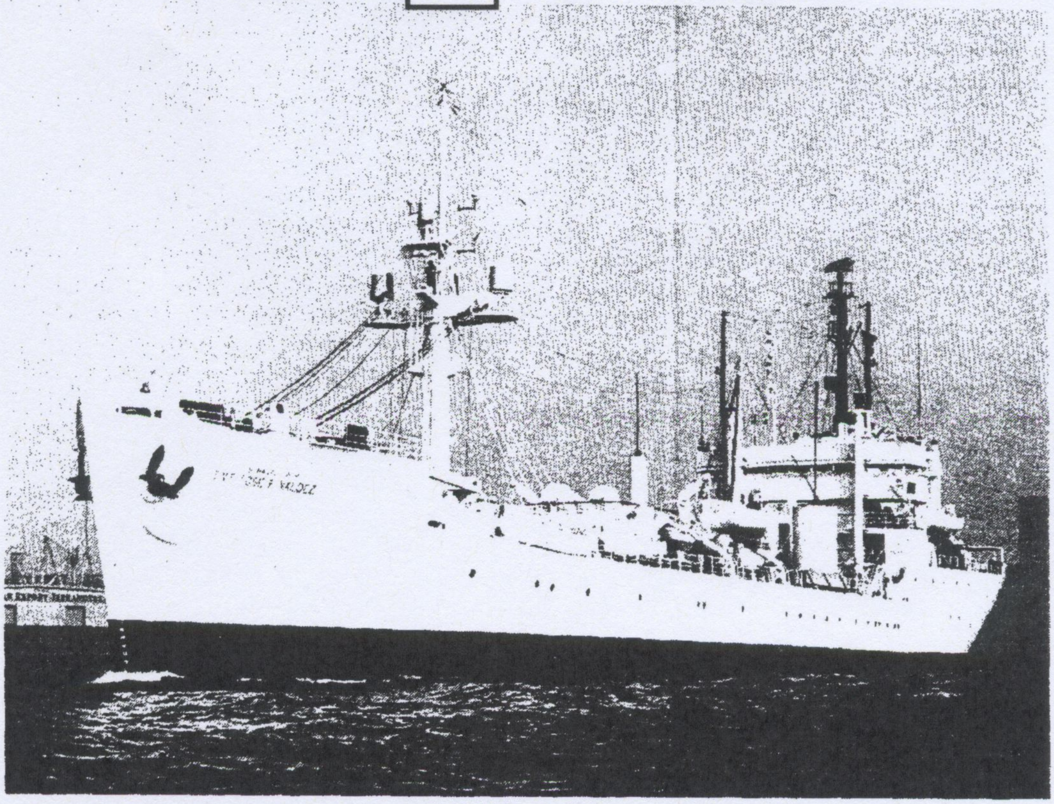
[2] Responsibilities for technical and material matters in connection with all MSTS ships were allocated in OPNAV Instruction 4700.9, dated 14 January 1953.



U.S.N.S. *Valdez.*

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(b)(3)-50 USC 3024(i)

mington Reserve Fleet to the New York Naval Shipyard for conversion. Her Liberty-type hull had been almost gutted, then strengthened and re-organized to serve her new functions. (The *Navy Times* on 20 May 1961 and again on 24 June 1961 described *Oxford* as about to work [redacted] She displaced over 11,000 tons and at best could make a speed of 11 knots. On 8 July 1961 she was commissioned as AG-159, U.S.S. *Oxford*.

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Interior space had been so organized that Sigint operations could not be observed by the non-Sigint Navy personnel of the ship's company. Most of the equipment (later augmented) for 10 Comint and 5 Elint intercept positions, including one radio direction-finder, had been installed. Separate facilities for secure electrical Comint communications were in place. Berthing and other accommodations for personnel met U.S. Navy standards.

After training at Guantanamo Bay, the men aboard U.S.S. *Oxford* took her to Cristobal at the Caribbean terminus of the Panama Canal and thence to Norfolk by a route which ran along the southern coast of the Dominican Republic and Haiti and thence into Guantanamo Bay for a few more days of training.

Oxford's first experience seemed to vindicate the proponents of shipboard collection platforms but at the same time revealed ways to make a TRS more efficient. *Oxford* could get into position to cover Cuban VHF links, and its USN-850 group had picked up a substantial number of Russian [redacted] transmissions. For example, she had recorded voice intercepts on more than 450 frequencies. Three changes in the equipment available to the operators could have permitted better results. Each Comint position needed a tape recorder which the operator could start quickly. The HFDF apparatus, instead of being near the other end of the vessel with the Elint positions, would be much more useful if immediately accessible to the Comint positions. Also, the number of SP-600 receivers aboard was insufficient.

Although some antennas exceeded the requirements, there were deficiencies both in the connections between other antennas and the receivers, and in communications arrangements for forwarding the intercepted material. Certain changes in the arrangements of later AGTRs were judged by the Director, NSA, to be mandatory. The types of equipment needed were determined in a conference of representatives of NSA, NSG (G-40, G-50, and G-60), and Electronic Defense Laboratories (EDL), acting as technical advisors.

Oxford's shakedown cruise report emphasized the necessity of allowing enough time between receipt of the tasking message by the Director NAVSECGRU, and the sailing date of the ship so that essential working aids could be acquired. It noted the absence of TEXTA pertaining to much of the communications intercepted. It also pointed out that NSA had supplied the one Spanish linguist and that the Navy linguists had been specialists in Russian (seven), Hungarian, Chinese and French (one each).

While *Oxford* prepared for a longer voyage, she participated with the Naval Research Laboratory in experiments to ascertain the practicability of bouncing signals off the moon for ship/shore communications. On 15 December 1961 the ship first received such a signal which had originated ashore, and after a few more weeks was itself able to transmit signals by this method to Cheltenham, Maryland. (See the section on the TRSSCOM system in Chapter VIII for details.)

Shipboard Collection Requirements

The Sigint requirements to be satisfied by shipboard collection were established in the usual ways—the Priority National Intelligence Objectives (PNIOs) endorsed by USIB, the Comint and Elint requirements lists, specific supplementary requirements falling within the broader ones, requests from the Department of Defense or other parts of the U.S. Government, and others arising from technical Sigint considerations. The analytic offices converted intelligence requirements into collection requirements.

Certain PNIOs could gain a timely Sigint response only by employing seaborne collection platforms. Among the 410 items on the older Comint Requirements List, 11 (which fell between those numbered 12 and 165) were of that description. In the numerous specific requests for information that the consumers called "supplementary guidance requirements," were many for which shipborne collection was either essential or important.

When the first TRS was under consideration, the area of critical concern was the Middle East, but as early as July 1956 the planners were considering eventual use elsewhere. By 1960 the Suez Crisis had temporarily abated, but in Africa, colonies were swiftly assuming the status of sovereign states,[3] "revolutions" in which

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[3] In April-June 1960, coverage applied to both sides of the [redacted] Cameroon, Ethiopia, Guinea, Liberia, Libya, Morocco, Sudan and Tunisia. In the next three months Chad, the two Congolese countries, Dahomey, Gabon, Ivory Coast, Malagasy, Mali, Niger, Somalia, Togo and Upper Volta were added. In September 1960, Mali split, so that Senegal was added to the list. Most [redacted] traffic was in French plain text.

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Communist machinations were suspected. Representatives from the newly sovereign states were accepted at the United Nations, where their votes became part of the fabric of international politics. Intelligence requirements pertaining to Africa therefore rose in the scale of U.S. national interests.

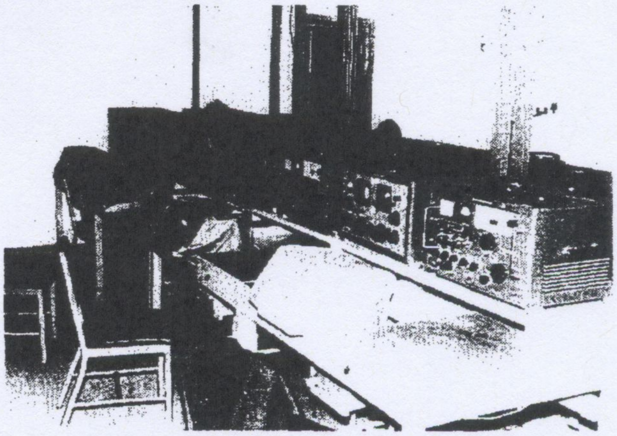
On 29 April 1961, the Director of Central Intelligence (DCI) punctuated discussions of the subject with a formal request to the Director, NSA, to mount a program to extend the Sigint coverage of Africa. The Director replied that NSA was studying the long-range problem of sub-Saharan Africa but could not prudently defer all action until that study had been completed. Because of the lead-time involved in essential preparations, NSA had prepared an interim program, one feature of which would be shipboard collection. That would be continued in any long-range program.

U.S.N.S. Valdez—*Project HOBBY HORSE*

NSA had ascertained from the Military Sea Transportation Service that in less than three months a small vessel, on which 21 intercept positions of different types might be installed, could be in African waters, ready to operate. The costs of conversion, rental and operation for a year were estimated as $2.5 million. If a second, larger vessel were also chartered from the MSTS, it could be acquired for an additional $4.1 million. Whether the intercept operators were NSA civilian employees or Navy personnel was an important but not critical problem to be solved. DIRNSA welcomed the DCI's support in seeking from the Department of Defense the funds to activate at least one ship as soon as that was feasible.

By 26 June 1961 NSA's program was sufficiently firm to make a formal request for emergency funds in the amount of $1,927,500, in order to charter *Valdez* from the MSTS. NSA would use TDY funds to provide advances so that the ship could be made ready for deployment by 1 September 1961, and would supplement initially the personnel from the Naval Security Group who would man the Sigint positions. To obtain the needed resources, 17 landbased positions monitoring Soviet targets would be dropped. Ahead of *Valdez*, *Oxford* would be sent on a search-and-development collection operation along the West African coast during the period from December 1961 to March 1962. Official approval from the Secretary of Defense, with an undertaking to release $1.9 million of emergency funds, was given on 7 July 1961. NSA and NAVSECGRU undertook close consultation and collaboration in executing the plan. NSA as sponsor of the ship submitted to the MSTS a Military Interdepartmental Purchase Request (MIPR) that it activate, modify, and operate the former passenger transport, *Valdez*. The MSTS contracted to fulfill that request for the sum of $1,466,500.[4]

Valdez needed internal changes less drastic than those the Navy had specified for *Oxford*. The civilian operating crew of the *Valdez* consisted of 13 officers and 29 crewmen, a number much fewer than *Oxford's* Navy crew. The Sigint component, known as the "Military Department," was considerably smaller than the "Research Operations Department" on *Oxford*. The configuration of equipment was simpler than that of *Oxford*, though the positions numbered 20 Comint and 2 Elint. An ESV "package" that would be fabricated and tested during the first portion of *Valdez's* cruise was to be flown over and installed while the ship was in an African port, probably during the month of January 1962. The space and connections aboard ship for the "package" were planned in advance. The main goal in 1961 was to get *Valdez* started on the job.[5]



An intercept position aboard U.S.N.S. *Valdez*.

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[4] An MIPR was issued annually for each separate MSTS ship used for this purpose. Terms of an agreement between DIRNSA and COMSTS specified their respective responsibilities.

[5] Valdez had a "C1" hull, 340 ft. long, 50 ft. beam amidships, with a draft of 7 ft. empty and 21 ft. fully loaded. She displaced 7,440 tons and made a speed of 9 knots or less. The Sigint operations area, including communications facilities, was placed in her No. 2 hold. The intercept positions consisted of 15 manual Morse, 2 HF/VHF radiotelephone, 2 single-channel printer, 1 NMGS, 1 VHF Sigint search, 1 AN/WLR-1, and later 1 ESV. Antennas of several types included a 6-ft. dish for S-band automatic tracking.

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On very short notice, NSA's Office of Communications obtained and installed the communications equipments to be used by the "Military Department." Serious deficiencies that could be corrected later were accepted in order to meet the deadline. No test equipments were provided to enable verification of the exact condition of on-line equipments. Daily Navy broadcasts could not be heard. The best standards of Comsec installation were not then applied. But on 15 November 1961 *Valdez* began her first cruise. Not until July 1965 were her communications installations at last thoroughly revised.

Shipboard Collection Requirements Grow

On 4 January 1962, *Oxford* started on a long journey to the Rio de la Plata and Buenos Aires, paralleling the coast of South America from the Caribbean to the river's mouth, and returning to Norfolk over much of the same route. The flexibility provided by a TRS was tested during *Oxford's* homeward trip. She also participated in monitoring a Soviet ESV.

Other requirements were soon to cause a still greater modification of plans for *Oxford's* deployment. Before either *Oxford* or *Valdez* had begun the African missions for which they were intended the President of the United States himself gave impetus to early coverage of Latin America by shipboard platform. Following a visit to DIRNSA by a White House assistant, Mr. Richard N. Goodwin, President John F. Kennedy officially requested the Secretary of Defense to formulate recommendations for raising the Sigint resources being applied to South and Central American coverage to a level commensurate with the great security and intelligence needs of the United States in that area. Through Mr. John H. Rubel, then the Assistant Secretary of Defense who supervised Sigint operations, DIRNSA received oral instructions to prepare the requisite plans. The Agency's recommendations were incorporated in a memorandum from the Secretary of Defense to the President, dated 25 November 1961, which, once approved, became the tasking document from the Secretary of Defense to the Director, NSA. Among recommended actions, the use of a shipboard platform was considered imperative—to quickly increase the coverage of Latin America. *Oxford,* which had been getting ready for Africa, was therefore to be sent instead along the Atlantic coast of South America.

Added capacity to cover Latin American targets was promptly paralleled by increased consumer requirements, which kept growing. In April 1963 PROD Requirement No. 103-63 called for more effort to collect illicit and guerrilla traffic. The Agency arranged for certain shifts among USASA's resources (and changes in the existing OPINS-10) by which two positions at USM-84 (Panama) could be released from General Search to clandestine targets. Political turbulence in Haiti and the Dominican Republic caused NSA to organize a fly-away team containing analysts, linguists, transcribers and reporting specialists for service either at [redacted] or aboard a shipborne Sigint collection platform.

Radio communications in Latin America were expected to have more than tripled in volume by 1970, and to have shifted to a considerable degree to sideband and higher frequencies. The increase in telephonic communications was expected to outstrip the pace of growth in telegraphic traffic. Main telegraph circuits would go to multichannel and employ teleprinter equipment. Morse traffic would persist on short-haul civil and military links, but VHF telephone with voice-frequency telegraphy would replace many existing Morse links.

A Pan-African radio network was also being established in the 1960s. While the major continental network grew, smaller localized systems were created, manned by some of the most haphazard Morse operators ever copied by U.S. interceptors.

The urgency of African coverage, as we have seen, obliged NSA to charter *Valdez* as an emergency action and to plan to send *Oxford* there, too. Then the still more urgent Latin American problem claimed *Oxford.* As those two ships were being deployed late in 1961, a different collection requirement of very high priority made necessary the chartering of a third ship for immediate, interim use as a special shipborne platform.

Shipborne Sigint Monitoring of Soviet Space Events, 1962

The Guided Missile and Astronautics Intelligence Committee (GMAIC) needed collection of signals connected with impending Soviet space events. Early in 1962 Atlantic missile-range ships that had been stationed west of Africa would have to leave in order to participate in the U.S. space program. Project *MERCURY.* No land-based or airborne collection of Soviet signals could fill the gap. The ball was thrown to NSA.

NSA prepared a program of ESV monitoring and missile tracking in the South Atlantic which USIB and the Director of Defense Research and Engineering approved. To meet the requirement initially, only *Valdez* on her first African cruise could be ready. Engineers who joined the ship at Freetown, Sierra Leone, got the WLR-1 system partly operable. At Capetown, South Africa, the ship's new Electronic Defense Laboratories

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(EDL) intercept system was delivered by air freight. The crates were taken aboard *Valdez* while a Soviet space-event support ship (SSESS) was moored a few yards away. The equipment was installed, tested and successfully used on 16 March 1962 and thereafter. The EDL engineers also spent many hours getting other collection equipment in *Valdez* in better working order.

Meanwhile, as a crash project NSA contracted with MSTS to operate still another of its ships for ESV and SSESS collection through the remainder of FY62. DIRNSA tasked the Chief, USASA, with manning and, with NSA's assistance, equipping a collection unit aboard the U.S.N.S. *Robinson*. The Navy supplied the communications team. One manual Morse position would monitor Navy broadcasts. The other positions would be oriented to collect signals transmitted from a Soviet space vehicle or from an SSESS to a space vehicle. The latter might include instructions to the ESV to begin its re-entry. All signals including voice would be recorded. After only three days for preparations, *Robinson* left Brooklyn on 9 January 1962.

To operate the ship during this mission, her civilian crew outnumbered the military Sigint personnel. *Robinson* relieved *Valdez* in February 1962, and then teamed up with that ship in the vicinity of Africa; in March it joined *Oxford* near South America, to collect signals from *Sputnik* XIII. In April, *Valdez* and *Robinson* intercepted signals from *Sputnik* XIV. The former also collected [redacted] Comint items associated with an SSESS.

During March 1962 representatives of NSA and NAVSECGRU agreed upon tentative schedules for deployment of *Oxford, Valdez* and *Robinson* in future months. Such advance planning was essential in order to insure the availability of logistical support in various forms. But the plans could be altered, and, as *Oxford* came north from Latin America in the last stage of her first major cruise, a fourth urgent Sigint collection requirement made a change unavoidable.

Close Shipboard Coverage of Cuba Begins, 1962

Sigint requirements pertaining to an outspokenly hostile Cuba grew after the Bay of Pigs fiasco in 1961. NSA prepared a plan to augment Cuban coverage in part by shipboard platform. [redacted] [redacted] took aboard special equipment and a team to attempt interception of the microwave [redacted] [redacted] [redacted] [redacted] circumnavigated the island in March and April 1962. Microwave signals were heard while the ship was in international waters. A seaborne platform on station might exploit that capability.

NSA's program of augmentation, aided by [redacted] reconnaissance, was reviewed by the DOD/JCS representative (Brig. Gen. William H. Craig, USA) on a Caribbean Survey Group. His recommendations to Brig. Gen. E. G. Lansdale, USA, of the Office of the Secretary of Defense were transmitted to the Deputy Secretary of Defense (Mr. Roswell Gilpatric). They formed the substance of the latter's directive to DIRNSA approving various items of the augmentation program. One major feature was the stationing off Havana of a seaborne intercept platform able to collect traffic from the Cuban microwave system and from VHF/UHF Cuban armed services' communications.

The approved program for Cuba included enlarging land-based NAVSECGRU activities at Key West and Guantanamo Bay, continuing a limited airborne intercept effort, and acquiring another MSTS-operated shipboard collection platform. Until that ship was ready, a substitute would be utilized. The necessary personnel would be obtained by releasing men from Sigint tasks of lower priority. The needed funds would be found within the appropriations for FY63, although supplementary FY62 financing would be considered if that became demonstrably necessary.

NSA kept a "fly-away team" of transcribers and analysts ready at Fort Meade, to reinforce land-based, shipboard or airborne collection and reporting units.

NSA arranged to charter from the MSTS another Liberty ship, later named the U.S.N.S. *Muller* (T-AG-171), for the station off Havana. She was to be converted at the Higgins shipyard near New Orleans. Until she could be used NSA sought the temporary assignment of a small ship on which equipment like that on [redacted] could be installed. When that request was rejected, the only recourse was to abandon the schedule planned for U.S.S. *Oxford* and to divert her to the Havana station.

USN-850, on *Oxford*, was accordingly assigned a Cuban reporting mission with the designator "RV." On 30 August 1962 it was ready to commence service with the same responsibilities and reporting system as a land-based station. The first normal Sigint products issued from a TRS were those from *Oxford* published on 6 September 1962 in three Cuban series, and within a week USN-850 had opened a total of five such series.

Handling the records and distributing the products of a mobile unit that was alternately active and inactive required a new accounting system that was adapted to the needs of both cryptologic and consumer recipients. P05 (later P2) devised one that at any time could provide a record of the exact status of ship's reporting. Subsequently, that system was adjusted in order to accom-

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modate a TRS that operated successively in different reporting areas.

Shipyard work on *Muller* fell so far behind schedule that it became plain that the ship could not assume *Oxford's* task until a month or more after *Oxford* was scheduled to enter shipyard for overhaul. [redacted] accustomed to operating in northern waters, was assigned by the Chief of Naval Operations to fill the gap. On 4 March 1963 it sailed from Key West with USN-863 aboard. That Sigint unit was manned by qualified operators from three different NAVSECGRU field units, the NAVSECGRU Headquarters Activity, and USASA. NSA had provided specialized training in [redacted] interception to some of the men. Headquarters, USASA, supplied four Spanish-speaking radiotelephone intercept operators and three other Spanish linguists.

To begin, USN-863 was placed on technical phasing looking toward a full reporting mission and on 21 February 1963 received the designator "SL." It commenced Sigint operations about 5 March 1963 and started reporting on 11 April. On 28 April 1963 it left for Key West and Norfolk, where the equipment from NSA was returned for rehabilitation.

Muller was equipped with the most up-to-date collection systems available for its Cuban tasks and, with accommodations for a Sigint unit consisting of 3 Navy and 1 Army officers, and 62 Navy and 36 Army enlisted personnel. Although primarily configured to cover Cuban communications, it was also able to handle Soviet signals originating in Cuba. It had no ESV telemetry collection gear but it could perform to some degree the same missions as those of *Oxford* or *Valdez*. Besides collecting known UHF signals, it was tasked to search for and develop other such signals, particularly those reported in collateral sources to be active, but never intercepted. The positions installed when it first left Key West were the following:

3 manual Morse
2 transcriber
2 VHF/UHF radiotelephone
2 [redacted]
2 VHF feeder
2 [redacted]
3 microwave (record only)
1 WLR-1 (less AN/WLA-3 amplifier)

When the ship went to Port Everglades on 23–27 May 1963, two WR-1 equipments and certain antennas were added. *Muller's* hull and propulsion plant resembled those of *Valdez*. The civilian crew numbered 11 officers and 48 crewman. Communications facilities on *Muller* were planned with active participation by NSA's Office of Telecommunications (then designated P2; later T1). Certain items provided by NSA were first used by [redacted] and then handed over to *Muller* at Key West. Before making the final installations in shipyard and at Key West, early plans were modified. The most important, based on the experience of *Valdez* and *Robinson*, provided receivers and associated teleprinters able to copy U.S. Fleet broadcasts.

On 23 April 1963, *Muller*, with William F. O'Reilly as Master, left the Higgins shipyard for Key West. Her Sigint unit (USN-856) was designated a "Research Operations Detachment," of which LCDR George D. Stein, Jr. was the Commanding Officer. The NAVSECGRU unit's home port became Port Everglades, Florida, while that of the ship remained in New York. USN-856 started with 3 officers and 49 enlisted men of the Naval Security Group and 1 officer and 26 enlisted men from USASA.[6]

On 26 April 1963 DIRNSA requested the Director, NAVSECGRU, to put the new USN-856 on technical phasing preliminary to a full reporting mission, and four days later, the unit received the reporting designator SL, by transfer from USN-853. USN-856 copied considerable amounts of microwave and VHF multichannel traffic that was unobtainable at other sites. By 29 May 1963, after almost a month on station off Havana, the unit had established its distribution of Sigint product and had opened four series of high intelligence value. Its ability to process and report was enhanced in stages which extended into 1964.

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[6] Its orders were DIRNAVSECGRU Op Order No. 2063, DTG: 172100Z Apr 1963 (S), supplemented by tasking message. The CO, RschOpsDet, was administratively attached to the CNO, and was additionally assigned for duty as CO, Mil. Dept, U.S.N.S. *Muller*. As such he was subject to regulations as set forth in COMSTS Instr. P3120.2B and responsible to COMSTS, Atlantic Area. Routine operational and technical control was exercised by DIRNSA; non-routine matters were under the management control and operational control of DIRNAVSECGRU. The CO, RschOpsDet, exercised military control over all military personnel, including Army, of the Sigint unit aboard.

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Chapter II

Programming for Technical Research Ships, 1961–1963

Preference for Commissioned Navy Ships

Oxford had barely been commissioned when NSA, in association with the Naval Security Group, began formulating a TRS program that included providing four more such ships, increasing NAVSECGRU's authorized personnel, and enlarging its facilities for training. The four ships were to be converted during FY62 and FY63. Each vessel would carry the equipment and personnel for 23 Comint and Elint positions, including the means of intercepting signals from Soviet ESV's space probes and ICBMs. NSA suggested that C-3 or "Victory" ships be converted, and be prepared for service in all waters except the Arctic and Antarctic Oceans.

The proposed program was cut back during review in the Department of Defense to only two conversions, which would begin during FY63 at a total cost estimated at $36 million. NAVSECGRU intended to see that the configuration of equipment reflected lessons learned from *Oxford*. The ships would commence their operations during the summer of 1965.

To NSA, that date seemed much too far away. Because of the long lead-times needed for some of the preparations, NSA in November 1961 sought instead an allocation of almost $33 million from FY62 funds. The money would be used for promptly converting two more Liberty hulls, training additional Navy personnel to man them, and developing the specifications which should govern conversion eventually of two Victory hulls.

NAVSECGRU produced a "Plan for Technical Research Ships" in which the Navy would operate *Oxford* and two other Liberties and two Victories with 44 officers and 644 enlisted men in general service billets, and 36 officers and 544 enlisted men manning Sigint positions. Training of the latter would begin one year before the ships to which they were to be assigned were ready for them. To meet those personnel requirements, the manpower ceiling of the Navy would need to be raised, while NAVSECGRU training facilities were doubled. The whole program was estimated to cost $69,150,000.

When that proposed TRS Program reached the Department of Defense, *Valdez* was about to start out and *Oxford* was at Norfolk, awaiting repairs following her shakedown cruise. Actual experience was therefore meager. In view of the wide discrepancy between the costs of converting the two ships, and in the anticipated operating expenses of a Navy AG compared to those of an MSTS-chartered ship, the prospect of investing in four more of the former demanded a close analysis of the reasons for preferring that more expensive type. On 24 November 1961 Mr. Rubel advised Secretary McNamara that he would investigate the possibility and desirability of substituting MSTS ships. President Kennedy was so informed the next day.

The Bureau of Ships successfully defended its estimates of costs to Mr. Rubel on 30 November 1961. Despite the probability that MSTS operation would be possible earlier and be less expensive, NSA and the Naval Security Group compared the costs and time required to convert *Oxford's* hull to Navy standards, and successfully advocated that additional platforms be of the *Oxford* type.[1]

To convert *Oxford* had cost about $13.3 million; *Valdez*, about $3.3 million. Operating costs were estimated at $1.5 million per year for *Oxford* and $1.2 million per year for *Valdez*. The time required to make *Oxford* ready had been much longer partly because of the drastic nature of the changes and partly because no priority had been assigned to the work, while that on *Valdez* had been an emergency action with a high priority. *Oxford* had been provided with accommodations for a much more numerous ship's company according to Navy standards, and had been strengthened with a view to a useful life of from 10 to 20 more years. *Valdez*, a former coastal personnel transport, had been adapted quickly to meet certain requirements during a much shorter period. The Director, Naval Security Group, expressed a strong conviction that any TRS should be operated by the Navy as a fleet unit because of the resulting positive and complete military control, enhanced security, and guaranteed logistic support and protection.

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[1] An elaborate comparison dealt with the two ships' Sigint Operating Capabilities in Comint, Elint, Processing and Reporting, Communications and other respects, the costs of their conversions, estimated annual operating costs, and the features pertaining to ships' performance. In Feb 1962, DIRNSA advised that *Oxford's* experience already disclosed the necessity of certain modifications of the configuration.

On 30 December 1961, Mr. Rubel recommended to the Secretary of Defense that the TRS Program be accelerated by beginning the conversion of two Liberty ships during FY62, and of two Victory hulls in FY63.

The next problem appeared to be that of finding the FY62 funds for an early start. The Navy's proposal to defer construction of an amphibious transport (LPD) and thus release more than enough for the two TRSs was not accepted by the Deputy Secretary of Defense; instead, he requested the Secretary of the Navy to proceed with both, delaying construction of the LPD until enough funds had been found in unobligated balances of other appropriations that were open to transfer. The extra costs of manning the two TRSs, and the necessity of raising the manpower ceiling, were also to be met by "adjustments" instead of increases. When it was discovered that the Department of Defense had been inadvertently misinformed about the inclusion of the needed 290 NAVSECGRU personnel within an increase of 1,970 billets programmed for FY63, the Director, NSA, undertook to meet the problem by reducing other Sigint tasks to be performed by the Naval Security Group, so that the Research Operations Departments of the two new TRSs could be properly manned from existing strength. These negotiations between NSA, NAVSECGRU, and the Departments of Defense and of the Navy cleared the way for adding the converted Liberty ships—eventually commissioned as U.S.S. *Georgetown* and U.S.S. *Jamestown*—to the Navy's shipborne platforms in time, if all went well, to operate before the end of 1963.

An attempt was made in April 1962 to ascertain from experience exactly what the effort to collect ESV signals in the South Atlantic had cost and what it had produced. Under the contract between NSA and MSTS, making *Valdez*[2] available and operating the ship until 1 May 1962 had required $532,297. After that, the charges were $3,300 per diem. Annual costs of a ship of that size for ESV coverage alone, as a replacement for *Robinson*, would be about $1.2 million. The vessel would have little to do but wait between Soviet space operations. If another hull like *Valdez* were to be converted and prepared for a combination of Comint and Elint coverage, for a total of $5.4 million, it could be made ready about 1 January 1963 and operated for the remainder of the fiscal year. Annual operating costs in subsequent years would be about $1.6 million.

Those calculations in a staff study prepared at Admiral Frost's request, though supporting the desirability of shipboard Sigint collection platforms, showed how expensive they would be.

A Case for the Chartered TRS

Oxford, *Valdez*, and *Robinson* (*Muller* was still in the shipyard) during the period from September 1961 through January 1963 yielded sharper operational concepts and an appreciation of intercept techniques. The Comint information obtained had been limited but significant, as shown in summaries of results from each of the cruises by the first three ships (Tab B of *Shipborne Intercept Study*, 26 Feb 1963). At the same time, the performance of the seaborne platforms had demonstrated that they could not produce Sigint as well as land-based stations while they engaged in extended coastal sweeps but only when they hovered.

Partly offsetting their capabilities were their inherent limitations. These might be summarized as the following:

1. Discontinuity on assigned problems because of need periodically to visit friendly ports.
2. Unavailability of some ports for diplomatic or logistic reasons.
3. Interference with collection by ship's own communications.
4. Unreliability of ship-to-shore communications in various areas, particularly in the southern hemisphere.
5. Need for superlative proficiency in collection activities.
6. High costs of converting and activating the ships.

Although recognizing the limitations to which a TRS was subject, the study concluded that trends in intelligence requirements and technical needs would require using the ships for Sigint collection in areas where land-based sites would probably remain unavailable.

The problem with reference to the TRS Program thus became by inference that of determining how many ships should be utilized, a calculation affected by the choice between types. P04 recommended that nine ships be operated continuously, deployed as follows:

1. African problem (including telemetry monitoring)—3 ships.
2. South American problems—3 ships.
3. Cuban problem—1 ship.
4. Search and Development—2 ships (Navy-manned TRS).

The ability of an MSTS-chartered TRS to spend more time on-station made it less costly and more effective than a Navy-operated TRS. It took three MSTS-ships to keep two on-station continuously, but three AGTRs could keep only one on-station continuously.

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[2] In the following November, an interesting report by LCDR J. S. Jennings described the first year's Sigint operations aboard *Valdez* at considerable length. It had sent to NSA more than 135 case notations and 646 reels of tape-recorded voice intercept and logs.

Since five AGTRs would be in operation before the end of 1965, eleven MSTS-chartered ships could provide the necessary reinforcements at a cost of $36.3 million (plus annual operating costs of $21.8 million). If the money for constructing new sixth and seventh AGTRs was diverted to converting and fitting out MSTS ships, it would pay for eight of the necessary eleven.

The study concluded that the Navy-operated TRS was admirably suited for wide-ranging cruises involving varied communications research and experimentation but not for tasks which required maximum on-station operations in areas far removed from U.S. Naval bases. The AGTR was a valuable resource able to respond rapidly to Sigint requirements against newly developing target areas. But the MSTS-ship would more closely meet requirements wherever "stationary" mobile platforms were needed. The main points were illustrated in a table as follows:

Comparison of USN and MSTS

Item	*U.S.S. Oxford*	*U.S.N.S. Valdez*
Conversion Cost	$13.3 million	$3.3 million
Annual Operating Cost	$1.5 million	$1.3 million
Sigint Positions	24	22
Ship's Crew	150	42
Time on Station	50–65%	70–85%
Average Daily On-Station Cost	$7,250	$4,400

The preference for MSTS-chartered TRSs expressed in the study, coming on the heels of the decision which caused the Department of Defense to approve beginning the conversion of TRS–2 and TRS–3 during FY62 and of TRS–4 and TRS–5 in FY63, raised several related problems in NSA.

Decisions on the TRS Program in 1963

The substance of the study was presented on 16 February 1963 to the Director, NSA (Lieut. Gen. Gordon Blake, USAF) and his principal subordinates. A discussion followed Mr. L. D. Terry's oral briefing. Two days earlier the Navy had recommended that, on all MSTS-chartered ships, the Sigint collection activities be performed by civilian operators instead of "Military Departments." Thus the Director was faced with proposals to operate 16 Technical Research Ships, 11 of which would be MSTS-vessels, and to supply civilians in the near future for *Valdez* and *Muller*, and later for the nine others. On the two ships 44 manned intercept positions and almost 200 billets for Sigint personnel were involved.

The discussion on 16 February 1963 identified certain lines of investigation to be taken up at once, before decisions could be made. It was the consensus, however, that *Valdez* and *Muller* should continue to be chartered at least through FY65. Acknowledging to the Director, Naval Communications (RADM B. F. Roeder), that the mixture of civilian and military personnel on MSTS ships could be hard on the latter's morale, DIRNSA also recognized that getting civilian operators for such long and solitary cruises would not be easy. "In many ways," General Blake reminded him, "the shipborne platform is like isolated shore stations that experience has proved can be manned best by military personnel."

Should the proposed program be smaller? Other sources of traffic were in prospect; they might lessen the need for as many as 16 ships. It was suggested during the discussion that a U.S. shipboard effort by not more than 5 AGTRs and 3 MSTS ships would be adequate.

Could the costs of converting MSTS ships be lessened appreciably? Not much encouragement to believe so arose from a conference of NSA and MSTS representatives held on 12 March 1963. Would it really be feasible, as the Navy suggested, to employ civilian intercept operators on *Valdez* and *Muller* in the numbers needed? On the basis of a study in the Management Services Organization, it was judged to be difficult and costly but feasible.

Funds for AGTR 2 and 3 (*Georgetown* and *Jamestown*) were authorized for expenditure in FY62. Activation of AGTRs 4 and 5 (*Belmont* and *Liberty*) was programmed to begin in FY63. AGTRs 6 and 7 were introduced into the program for FY69 at an estimated cost of $35 million, but no funding for them could be expected unless warranted by actual interim experience.

Through CCP actions it was agreed that *Muller* and *Valdez* be kept in service through FY69 and that the Sigint positions on them be manned either by military or civilian personnel in accordance with decisions to be reached subsequently.

Conversion of the two Liberty hulls into the Technical Research Ships eventually known as U.S.S. *Georgetown* (AG–165) and U.S.S. *Jamestown* (AG–166) began under specifications stated in an official CNO directive of 19 April 1962. In the light of experience on *Oxford* during her first cruise and the first part of her sojourn on the Havana station, DIRNSA in January 1963 informed the Director, Naval Security Group, of certain desirable changes. No additional funds were available but more time to effect them might be taken if necessary.

On 28 February 1963, a Navy briefing and subsequent discussion resulted in agreements applicable to the conversion of Technical Research Ships in the future. DIRNSA revised the operational requirements. After review they were translated into specifications for the two Victory hulls to be converted with FY63 funds (eventually commissioned as U.S.S. *Belmont* and U.S.S. *Liberty*). On 5 July 1963 another formal Navy directive incorporated those specifications.

Georgetown was commissioned on 9 November 1963 (as AG–165) at Portsmouth, Virginia. On 2 January 1964, with USN–852 aboard as its Research Operations Department, the ship started a shakedown and training cruise in the Caribbean.

Jamestown was commissioned on 13 December 1963 (as AG–166) and, with USN–853 aboard, headed for a 37-day shakedown and training cruise to Guantanamo and elsewhere in the Caribbean. Before returning to Norfolk, both ships visited Key West and tested their capabilities in an operating area off Havana, where U.S.N.S. *Muller* kept station.

At the end of 1963, therefore, the shipboard collection program was being conducted by *Oxford* (since September 1961), *Valdez* (since November 1961), *Robinson* (since January 1962), and *Muller* (since April 1963), while *Georgetown* was just about to start. *Jamestown* was to follow. U.S.S. *Belmont* and U.S.S. *Liberty* were below the horizon but approaching.

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Chapter III
Broadening Coverage

Shipboard Collection Effort, 1963

During 1963 the Technical Research Ships produced much more experience on which to base planning and possible revisions in the TRS program. *Oxford*, released from the Havana station and reconditioned for the area and type of targets covered in her first cruise, went down the eastern coast of South America from Venezuela to the Rio de la Plata, and up that broad stream to Buenos Aires. She had 18 manned positions—14 manual Morse, 1 radiotelephone, 2 radioprinter, and 1 Elint—and was tasked to search, develop and report on [redacted] and internal communications. In preparation for the cruise NAVSECGRU had sent one officer and seventeen enlisted men for a period of training in association with analysts at NSA, Fort Meade. Aboard for the operation were four Spanish and Portuguese linguists provided by NSA.

By September 1963, *Oxford* (USN–850) had opened series of Sigint products for Argentine Air, Joint, Army, Navy, and Police, Brazilian Air, Army, Navy, and Police; Bolivian Army and Unidentified. It also sent other material to NSA for exploitation. When the ship returned to Norfolk on 6 September 1963, it remained there undergoing overhaul until 30 December. It then began a refresher training cruise to Guantanamo.

Robinson originally left the United States in January 1962 to serve in a distinctive character as a monitor of Soviet space activities on stations in the South Atlantic near Africa. After beginning work on *Wyandot* as replacement for *Robinson*, in September 1962 that plan was abandoned, and *Robinson*, as USM–615, continued to be NSA's (and ASA's) major shipboard platform exclusively devoted to covering Soviet space events. On 23 April 1963 the ship started back across the Atlantic for an overhaul and reconfiguration, accomplished at Norfolk from 17 May to 5 July; it then returned to the eastern coast of Africa via the Mediterranean and Suez Canal.

To meet an urgent DIA requirement for ESV coverage while *Robinson* was absent, the Joint Chiefs of Staff arranged for NSA to use [redacted] By other arrangements which NSA worked out, USAFSS provided an equipped van, USASA furnished Elint operators, and the Air Force flew them from Andrews Field to Mombasa for embarkation on 11 June 1963. [redacted] then went to an operating area in the Indian Ocean where it collected signals from two ESV flights, brought the recordings to port for shipment to NSA, and went back to the station pending *Robinson's* arrival in Mombasa. There, on 29 July, the substitute debarked the Sigint personnel and equipment for flight back to the United States, and handed over its temporary mission to *Robinson*.

Robinson remained in the Indian Ocean until December 1963. An interlude in Soviet space events left it with only an improvised task. USM–615 therefore tried, from an area three or four days' distant from its normal position for ESV collection, to intercept certain signals from one of the Soviet missile test ranges through the employment of the trans-equatorial propagation phenomenon. They could, however, not be heard. The ship remained at sea without a break from 26 September to 3 November 1963 because of the expectation that an ESV operation would occur when she had been scheduled to visit port. USN–615 collected signals from *Sputnik* 44. On 19 December 1963, after some of her Sigint team had been relieved at Capetown, *Robinson* sailed to replace *Valdez* at another ESV monitoring point in the South Atlantic, about 100 miles northwest of Luanda, Angola.

Valdez, after being at Capetown for about 12 weeks for overhaul and the installation of air conditioning, on 8 March 1963 began an exploratory trip up the east coast of Africa as far as Mombasa. For about one week it pushed against headwinds and strong currents and at times made little more than one knot. In addition to difficulties with navigation, it suffered from severe impediments to its communications. From Mombasa, it returned and went through the Gulf of Guinea as far as Freetown, and thereafter remained along the western coast of Africa or in the South Atlantic until the end of the year. It accumulated material for courier delivery to NSA because of communications failures. After a decision to operate the ship through FY66, she was scheduled for another period in the shipyard at Capetown in January and February 1964, during which improve-

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ments would be made in her Elint and ESV intercept equipment.

Muller kept station off Havana from May to December 1963, subject to frequent short trips to Key West to deliver material not electrically transmitted and to stays in Port Everglades for shore leave, fresh water and supplies, and for ship's maintenance. The other TRSs engaged in cruises along coasts, "sweeps" that produced short periods of collection, except when diverted to a station from which to monitor even briefer Soviet space events. *Muller*, as a floating station, had produced highly gratifying results.

Experience with the four ships in service had already demonstrated the ability of any of them to go on fairly short notice, though at a slow speed, to the point where it was most needed. The TRS program in 1963 had required a considerable degree of improvisation and changing of tasks. It had also confirmed that flexibility of assignments was limited by the kinds of specialized personnel and equipment aboard. The proponents of an enlarged TRS program were compelled to assess the experience thus far, and to analyze it more closely after another period of shipboard collection operations.

Shipboard Operations in 1964

In 1964 floating platforms cruised along the continental coasts of Latin America and Africa (south of Sahara), and monitored Soviet space events and related support ships from points in the South Atlantic and the Indian Ocean. One major innovation was the routing of two vessels through the Mediterranean, Red Sea and Gulf of Aden, one in each direction, to determine the best positions from which to collect sophisticated transmissions reported in collateral as originating in coastal areas of northern Africa and the Middle East. TDY teams were put aboard the new *Jamestown*, which headed across the Atlantic to Gibraltar, late in April, and the old *Robinson*, when it stopped at Aden, on 1 May 1964. After the Mediterranean-Middle East mission, *Jamestown* continued down the eastern coast of Africa and entered Capetown harbor on 9 July 1964, but *Robinson* went from Rota, Spain, to a port in New Jersey where she was stripped of intercept gear and inactivated.

Oxford completed two major cruises in the Caribbean and along the coasts of South America, going through the Panama Canal four times, and then in Norfolk began preparing to make her first voyage in 1965 to the western coast of Africa. The two voyages produced excellent Sigint product and technical reporting, including items concerning guerrilla activities in Bolivia and Venezuela.

Valdez cruised along the eastern coast of Africa, was overhauled at Capetown, then moved along the western coast and lingered in particular where collection of Congolese traffic was most effective. In January she tried, and in July and October she again endeavored more successfully, to intercept telemetry signals related to the overflight of other *Sputniks*. At the same time *Jamestown* sought similar collection from a station on the opposite side of Africa. At the very end of 1964, *Valdez* was bound again for the eastern coast of Africa, stopping first at Durban.

The station off Havana was kept in 1964 by *Muller* (USN–856) with *Georgetown* (USN–852) as her relief. The latter suffered several malfunctionings of her propulsion plant and was almost a month behind schedule on 19 April 1964 when she relieved *Muller*. On 29 April, USN–852 began distributing Sigint product and soon opened several Cuban and Cuban/Soviet series. *Muller* went at once to Tampa for a delayed overhaul. On 30 June, after she had again taken up her regular mission near Havana, *Georgetown* left Norfolk for her first long cruise via the Caribbean to the eastern coast of South America as far south as the Rio de la Plata. There she visited Montevideo, Uruguay, and Buenos Aires, Argentina, before revising her general course to reach Norfolk again on 26 October 1964.

In 1964 the arrangements for processing Cuban microwave material made further progress. Bits and fragments only of the whole "take" had initially been selected aboard *Muller* for timely reporting. The whole went in weekly batches to NSA, Fort Meade, to be processed from wideband tape recordings. Beginning with the most recently collected, the analysts worked back, sometimes publishing a Saturday's traffic as early as the following Tuesday, but occasionally having on hand untreated material when a new batch arrived. Some traffic then went into the backlog and never emerged. In the latter months of 1963, additional equipment for demultiplexing and recording voice signals installed in *Muller* expedited reporting greatly. Thereupon past traffic was reviewed to establish the most lucrative channels to monitor for military and para-military content. NSA issued a First Echelon Processing Priority (FEPP). Periodic reviews made possible the return to top priority of Cuban channels and channels that were reactivated after quiet periods. The beneficial results in 1964 were substantial.

Another important outcome of the Sigint surveillance of Cuba was application of a new HARVEST data-processing program to Cuban traffic in a way that yielded much more product in one or two hours than had previously been obtained from 24 hours of machine processing.

The two Victory hulls (*Belmont* and *Liberty*) being converted into TRSs at Bremerton, Washington, did not become available during 1964. Both ships were commissioned late in 1964 but neither was ready for its first Sigint training cruise until well along in 1965.

By the end of 1964, broadened coverage had produced important Sigint products and an extensive technical base. The results seemed to confirm the wisdom of utilizing substantial shipboard platforms for Sigint collection, processing and reporting. It was time to move from testing to preparing for a longer-range future.

Chapter IV

Preparing for a Longer-Range Program

NSA's Shipboard Sigint Systems Study, 1964—1965

Converted hulls configured as TRSs were not expected to remain operable for more than about ten years. What would replace them?

In 1963 the Navy began preparing for the acquisition, after *Belmont* and *Liberty*, of newly built ships that would be designed in the light of recent experience and for anticipated missions. The Bureau of Ships in March 1963 estimated the costs. If a TRS followed a new Navy design, embodied Navy developments, and was constructed according to the Navy's exacting standards for military vessels, the first ship would cost $37,500,000, and others $35,000,000. If instead it adapted the design of a cargo transport to accommodate electronics installations and supporting facilities, costs might run $5,000,000 less.

Estimates for antennas were $1,000,000 more per ship than for the first four AGTRs.

The propulsion systems could make a TRS capable of making 20 knots and having a range of 10,000 miles. If 17 knots would suffice, and if various optional features were omitted, total costs could be substantially reduced.

At that time, NSA was obliged to recognize that although new TRSs were needed, the OSD would not approve outlays of $35,000,000 per ship. Indeed, some OSD officials believed that the main question was not what type of vessel would make the best TRS but whether any seaborne platform at all was needed. The DDR&E approved including in the CCP the funds for a TRS Development Study but only if NSA first worked out a satisfactory procedure for determining what specific Sigint requirements could only be met by collection from a seaborne platform, and if NSA and NAVSECGRU together formulated objectives and guidelines for a TRS Development Study. The Assistant Secretary of Defense (DDR&E), Dr. Eugene G. Fubini, furnished some specifications for the study. He proposed that consideration be given not only to Technical Research Ships but also to smaller vessels of the trawler type, and that the potentialities of portable Sigint collection equipment for temporary installation on Navy ships be examined.

The opportunity to program new AGTRs, which NAVSECGRU strongly urged, was postponed until the findings of the studies conducted in 1964–65 could be weighed.

In July 1964 NSA launched an extensive study of mobile collection resources, utilizing two different groups under a single steering committee for airborne and shipboard operations. CAPT William A. Ellis, USN, who was then the Chief, D31, headed the steering committee. The Assistant Director for the National Cryptologic Staff (RADM L. E. Schulz, USN) and the Assistant Director for Sigint Production were both concerned with the conduct and findings of the study. Naval officers assigned to NSA and others representing Headquarters Activity, NAVSECGRU, participated in that portion emerging as the *Shipboard Sigint Systems Study*.

What was termed Phase I of the shipboard study responded to Dr. Fubini's request for the formulation of procedures for reviewing, defining and validating requirements for collection systems on seaborne platforms. A first draft, ready on 30 September 1964, ran the gauntlet of revision and in its final form was signed on 16 December 1964 by the Deputy Director, NSA. At almost the same time, the results of Phase II were available in a report called "Validation of Requirement for a Shipboard Sigint System," containing recommendations of which some required collaboration by NSA with the Navy in specified ways, and others identified tasks to be performed in NSA's Sigint Production Organization.

The criteria for establishing shipboard collection rather than shore or airborne collection were summarized in a report entitled "Phase II Report, Systems Study." When a land base could not be obtained, or would be more permanent than the intelligence requirement supported, or having been obtained, was threatened by military or political conditions, shipboard or airborne collection would be in order. In a coastal area where airborne collection could not be maintained for the length of time required, a seaborne platform was indicated. In some areas, such as the impact zone in the mid-Pacific of the Soviet Long-Range Missle-Test Range, shipboard collection was uniquely suitable.

Implicit in identifying such criteria was the principle that Sigint products would justify the cost, and that Sigint readiness for critical situations rested upon a technical base that was up to date, used by platforms capable of applying it quickly.

The goal of Phase III of the Shipboard Sigint System Study was to provide technical guidance that would enable the Navy to develop an economical and effective shipboard program for fulfilling validated shipboard Sigint collection, processing and reporting requirements. No attempt was made to recommend the types and numbers of platforms to be provided but instead to furnish as much of the information about collection, processing, reporting and communications requirements for each of twelve geographical areas as possible, and in a form helpful to the persons who formulated the program.

Disagreements over items in the report delayed its issuance as an Agency product; in September 1965 it was officially released, with unreconciled NSA comments, for the use of NAVSECGRU planners. The report proposed modular sub-systems for each signal band and indicated a basic combination to which others could be added in accordance with target communications to be expected in the geographical areas of a ship's mission. It was a body of data intended to meet the instruction of the OSD that it provide guidelines for a TRS Development Study. Three classes of collection systems were advised.

The long delay in releasing the study allowed a separate but related AGER development to overtake it, and to affect its impact.

Use of TRSs for Comsec missions

A proposal by "S" Organization to use a TRS to simulate a Soviet trawler covering traffic from the U.S. Atlantic Missile Range, and thus to detect any need for better Comsec, was considered late in 1964. D3 and P agreed that the use of a TRS for monitoring ought not to interfere with a primary Sigint mission to the extent of altering schedules or operating areas, and that it would best be confined to *Oxford, Jamestown* and *Georgetown* during their transit to and from the Caribbean or South America. Those restrictions would release monitoring capacity for from six to eight weeks per year only, at times not correlated with maximum U.S. range activity. But the gear on the ships would not necessarily be suitable for Comsec monitoring, and collected data would have to be shipped to the U.S. by means that would involve various problems. Therefore, the NAVSECGRU, if the Navy concurred, might work out with NSA the procedures for deploying a TRS with a Comsec mission so that no impairment of the Sigint mission occurred. Also, the training of newly assigned Sigint personnel during the first stages of outward-bound cruises was found to be a major impediment to Comsec monitoring.

No TRS was stationed like a Soviet trawler off the coast of the United States to monitor U.S. traffic, and no effective sampling occurred there during transit between port and Sigint collection areas. In Southeast Asia, however, U.S.S. *Jamestown* had equipment for HF, VHF and UHF coverage, and accommodated Comsec specialists aboard as one part of a Navy MARKET TIME Comsec survey early in 1966, and of another survey in 1968.

R/D Positions on Ships

Georgetown, Jamestown, Belmont, and *Liberty* were each equipped at the outset with a reasearch-and-development position consisting of receivers for frequencies ranging from 30 MHz to 2040 MHz, two recorders, and considerable equipment for analyzing signals. A non-Morse search-and-development position on the same ship lacked the analytical equipment but was equipped to receive signals over a somewhat wider range and had one more seven-track recorder. In March 1965 the DDR&E (Dr. Fubini) visited *Jamestown* and raised several questions, including the necessity for an R/D position. It had actually been used on *Jamestown* for missions which might be performed instead by the NMSD position. On 24 March 1965, the Assistant Director for Research and Development Operations (Mr. Mitford Mathews, Jr.) proposed to the Assistant Director for Sigint Production (Maj. Gen. John J. Davis, USA) that the four R/D positions be reprogrammed as operational positions, and be available to R/D only for short-term high priority tasks according to areas of operations. The four R/D positions were subsequently considered NMSD positions under C13's control, while waiting to program and install other intercept equipment in specially configured positions.

Dr. Fubini also suggested that the capability of wideband recorders on the ships be extended to cover 1.4 MHz. That proposal could much less readily be accomplished, partly because of the space required, partly because of the inability to process and retrieve signals while the ships were in home ports.

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Sigint Activities on Trawler-type Platforms, 1965

While NSA's prolonged Shipboard Sigint Systems Study emphasized the Technical Research Ship, as instructed by the DDR&E, data relevant to the possible use of smaller, trawler-type vessels was a by-product. During OSD Review of the Consolidated Cryptologic Program (CCP) for FY65 to FY71, DIRNSA was specifically instructed to investigate the use of smaller ships. The OSD approved continued chartering of *Valdez* through FY67 and perhaps longer, but added some reservations about costs of the larger TRS compared to the smaller ships, and requested that NSA submit a specific proposal for use of trawlers in lieu of such ships as *Valdez*.

An NSA Sigint Trawler Study was initiated as a follow-up action to the CCP decision by the ADN and ADP, who authorized P3 (later K) to conduct it. On 5 August 1965 P2 tasked P21 with executing the study.

A Navy Program for Trawlers Combining Sigint with Other Forms of Surveillance

The interest expressed earlier by the DDR&E to the CNO in trawlers led to consideration within the Navy of their possible employment to acquire not only Sigint but also other varieties of intelligence data. Before Phase III of the Shipboard Sigint Systems Study had been completed, and long before the NSA Sigint Trawler study began, a Navy project was taking shape.

Elements of the Navy preferred tactical Sigint surveillance in association with several kinds of sensors as a form of direct support. The trawler-type of ship that they had in mind would be equipped with the means of collecting photographic, infra-red, acoustic, meteorological, oceanographic, or possibly other data. At one stage the prospective platform was termed an "Integrated Intelligence Collection Ship (AGI)." Later, instead of the word, "Integrated," the concept turned to another word coming into wide use and having a broad connotation, "Environmental." The scope and the non-Sigint aspects of their operations were eventually underscored by calling them "Auxiliary General Environmental Research" ships (AGER). They were expected to engage on occasion in "shadowing" or even in photographic missions.

On the basis of informal discussions with the DDR&E, the Navy converted a small cargo ship, AKL-25, into the U.S.S. *Banner* (AGER-1), so that she could start across the Pacific Ocean on 1 October 1965 to undertake her first mission. Just as NSA was beginning the Sigint Trawler (AGER) Study, the Navy was rounding out a project for converting two more small ships and building twelve others to function as AGERs. These ships were possible alternatives to the $35,000,000 TRSs.

Banner was a 935-ton vessel capable of making 12 knots. Through a Navy contract with Ling-Temco-Vought, she was configured with five Sigint positions. They covered the part of the electromagnetic spectrum from 3 KHz to 10.75 GHz, with capabilities for acquiring manual Morse, radiotelephone, radioprinter, and telemetry and Elint signals. The last consisted of a signals analysis system (SAS-2600) and a countermeasures receiving set (AN/WLR-1). The five positions, or sub-systems, were contained in 25 racks, of which 13 were used for telemetry and Elint, and faced the other 12 racks. Antennas, power distribution boxes, and a maintenance work table completed the installation.

Each position had patch panels enabling the operator to apply maximum flexibility in using the equipments. Scanning receivers with corresponding displays as well as search receivers were provided. Ten speakers permitted audio-monitoring. Two wideband recorders and six narrow-band recorders, and an ink recorder were available. Record trunks and audio-video trunks enabled the operators to tape information on the wideband recorders. There were equipments for signals analysis, radio-direction finding, aid to tuning, spectrum display, pulse analysis, frequency counting, and demodulating. A time-code generator provided digital time for display and recording. Communications-security equipments enabled *Banner* to copy Fleet broadcasts, and using separate keylists, for GENSER (general service) and NAVSECGRUDET communicators to employ the same teleprinter security system.

On 16 July 1965, NSA responded to a request by the Director, NAVSECGRU, by endorsing the Navy's proposal to test the effectiveness of small ships as seaborne Sigint collection platforms. The plans called for U.S.S. *Banner* to operate off Vladivostok and elsewhere in the [redacted]nd Okhotsk for about six weeks later in the year.

On 30 August 1965, the Navy program as it then stood was outlined to DIRNSA. It provided for converting three and building twelve ships, installing about five positions on each, manning them with some 15 officers and 490 enlisted men, and treating all fifteen as Direct Support Ocean Surveillance and Intelligence (including Sigint) Collectors. The program was to have three phases: (1) deploying a single vessel in circumstances providing a valid test; (2) extending the test to

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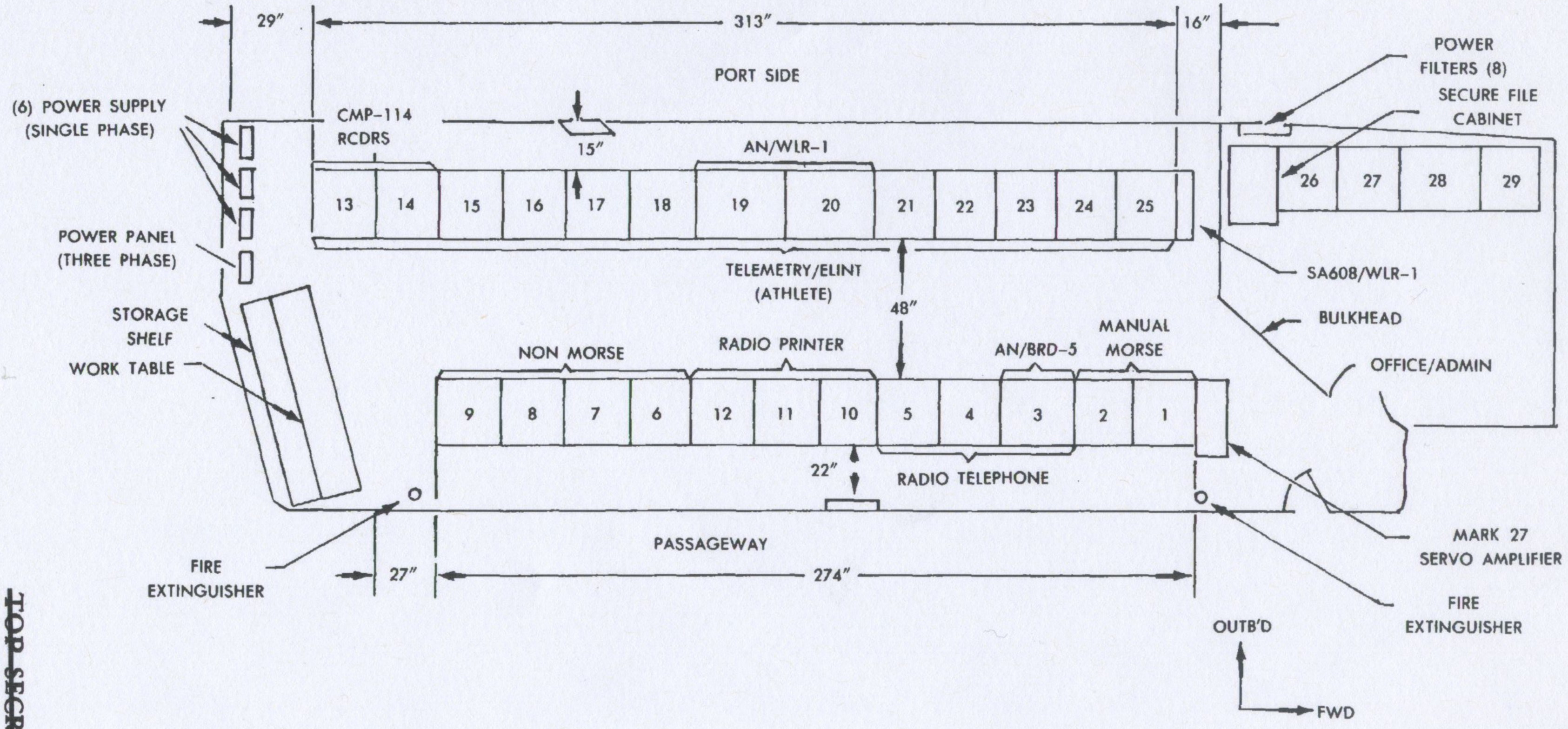
Sod Hut Reconnaissance System



Configuration in USS BANNER in 1965

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other areas by adding two ships, and (3) operating twelve newly built ships. The Sigint capabilities of the small ships would be made available for national tasking and for use in important areas not hitherto well covered, but as a mission secondary to the role of tactical surveillance.

The program was understood to be favored by the Director of Central Intelligence and the Director, Defense Intelligence Agency. The Director, NAVSECGRU, originated a Resource Program Change Proposal dated 1 September 1965 to install a Sigint capability aboard Navy trawler-type ships for direct tactical support.

After discussions at various levels, DIRNSA's official reply to the description of the Navy's program was issued on 7 October 1965. The Director concurred only with the first phase, the deployment of *Banner*.

While *Oxford* and *Jamestown* went to the western Pacific to work in designated areas in connection with the war in Vietnam, *Banner* left Puget Sound to engage in collection of Soviet naval traffic in waters off Vladivostok. *Banner* was also equipped to record telemetry signals by techniques in which part of its crew had been trained at NSA. After operating in the [redacted] on her first cruise she would return to port at Sasebo on 16 December 1965, and later to her home port in Guam.

Banner was to some extent a counterpart to the Soviet "trawlers" that by 1965 showed unlimited confidence in the protective efficacy of international waters.

On 7 October 1965, the Secretary of the Navy asked the Secretary of Defense for a supplemental allocation of $9,800,000 in the current fiscal year to meet the costs of converting not only *Banner* but the two additional trawlers of Phase II. His request was first reviewed in the office of the ASD (Systems Analysis), but was later transferred to the office of DDR&E for consideration within the CCP. There DIRNSA made clear that the Navy's approach to operational control of the Sigint resources to be placed on the three small ships was one with which he could not agree. The Deputy Secretary of Defense (Mr. Vance) soon advised the Secretary of the Navy that an agreement on the concept of operations would precede the release of any money.

Agreement on Trawler Operations, November 1965

An understanding between NSA and the Navy was then quickly reached, so that the Secretary of Defense approved provisions of $8,600,000 of FY67 funds for Phase II. The agreement was stated in a document reproduced below:

TRAWLER OPERATIONS

1. Purpose: To provide small, highly flexible non-combatant naval ships possessing graduated capabilities to meet national and naval requirements for surveillance missions. In the near future, while the number of trawlers remains small (viz. 3 ships), flexibility and multipurpose capability is particularly necessary to allow deployment against whichever targets are determined to be of primary interest at the time. The longer range program for additional ships should provide sufficient platforms to permit deployment for full-time NSA tasking to meet specific Sigint collection requirements as well as fleet surveillance requirements.

2. Concept for Phase I (1 ship—U.S.S. *Banner*): Test operational feasibility and political implications. *Now in progress.*

3. Concept for Phase II (3 ships): Several modes of operation are envisioned to permit adequate test and evaluation and follow-on usage.

   Note: Where direct support is indicated as the primary Sigint tasking, operational control of the Sigint resources will be delegated by DIRNSA to the appropriate Navy commander.

   a. Mode 1. Continuous operation in one area by one ship at a time for an indefinite period of fairly long duration for operational test and evaluation of all sensors, including utilization as a counter-irritant to Soviet trawlers. Navy ship operational control. Sigint tasking: (1) Direct support, primary; (2) NSA, secondary.

   b. Mode 2. Utilization of any available on-station time not required for a, above, by response to NSA for deployment to some other area for operational test and evaluation. Navy ship operational control responsive to NSA tasking. Sigint tasking: (1) NSA primary tasking pursuant to national objectives and requirements; (2) Direct support, secondary, unless ship in potentially dangerous situation and safety of ship is paramount.

   c. Mode 3. Utilization as a primary Sigint collector. Initially, the purpose would be to evaluate such capabilities fully for certain deployments. Control as in Mode 2, above, Navy responsive to NSA.

   d. Mode 4. Operation in areas other than a, above, for purposes similar to Mode 1. Navy ship operational control. Sigint tasking: (1) Direct support, primary; (2) NSA, secondary.

   e. Mode 5. Diversion from any of foregoing to perform high priority missions as agreed, or as determined by higher authority, to take advantage of one or more sensors to meet critical needs. If mission is non-Sigint: Navy ship operational control; Sigint tasking: (1) Direct support, primary; (2) NSA, secondary. If mission is Sigint: Navy ship operational control responsive to NSA; Sigint tasking; (1) NSA, primary; (2) Direct support, secondary, except as paramount to safety of ship.

4. Concept for Phase III (more than 3 ships—numbers of ships, their configuration, and future programming change proposals to obtain them to be dependent on results of Phase II and on updated assessment of requirements):

a. Operations similar to Phase II to meet specific surveillance objectives.

b. Certain ships to be configured and used primarily for Technical-Research-ship type operations under NSA Sigint operational control.

5. Equipment for Phase II: The WATERBOY package would probably be the optimum equipment configuration for the first three ships. However, it is not practicable to obtain such a complete system in the time frame involved. Therefore, the equipment configuration proposed consists of certain WATERBOY and other tested components which will meet the criteria of the Sigint target environment involved. Review of specific details of the Sigint equipment list by the Navy and NSA will continue up to the point of procurement to insure that the optimum obtainable is procured.

For AGERs engaged primarily in direct support operations, operational control of the Sigint resources was delegated to the CNO by DIRNSA. Safety of an AGER or a TRS in any given area of operations was a military matter, involving both threat and available protection. DIRNSA's concern for the security of cryptologic material aboard might elicit a suggestion to the JCS/JRC about the degree of hazard in a specific area of planned intercept operations but the decisions would be made by the Navy and the JCS/JRC.

The Navy program for providing Sigint direct support had not, in December 1965, yielded specifics which NAVSECGRU could provide to the NSA Trawler Study Panel. The Navy plans envisaged such missions as shadowing Soviet Bloc AGIs during Fleet exercises, acting as an advance scout or picket ship to provide early warning to Fleet carriers during transit voyages in either the Atlantic or Pacific, or in a comparable role during U.S. Fleet exercises.

NAVSECGRU was well aware of the high cost and the unlikelihood of installing and manning Sigint positions solely for direct support functions on small ships with limited space. It was also aware of the fact that conflict between direct support and normal Sigint collection requirements could arise largely because of the problems of diverting resources and platforms from one area and role to others, and in a message from Director, NAVSECGRU, to Director, NSA, in December 1965, it was stated that ". . . In the interest of most effective use of resources (personnel and equipment) consider that Trawler Study Planning should incorporate concept contained in Draft OPDOC 19 to allow temporary delegation of Sigint operational control to operational commanders when validated requirements exist to provide direct support to fleet operations."

In recapitulating the status of the Navy AGER program for the Directors of NAVSECGRUPAC, NAVSECGRUEUR, and NAVSECGRULANT on 10 December 1965, the Director, Naval Security Group, pointed out that several modes of operation were envisioned during Phase II in order to permit adequate test and evaluation applicable to subsequent usage. In Phase III several ships might be configured and used primarily under DIRNSA's operational control like the Technical Research Ships. "Prudence dictates that every effort be made to meet National Sigint requirements to the maximum degree possible" during Phase II, he concluded.

The preparations for a longer-range TRS Program were affected by the possibility of substituting AGERs for AGTRs and by the necessity of thoroughly analyzing seaboard operations in terms of costs and effectiveness. While studies were being made, individual engaged in them were also deeply involved in the current operations of Technical Research Ships.

Chapter V

Technical Research Ships in the Western Pacific

By 1965, the successful collection aboard TRSs from sources previously inaudible was generally recognized. Their capabilities led to the allocation of resources to exploit the traffic that the TRSs could copy. Responses to Sigint requirements and the likelihood of establishing a flow of U.S. Sigint quickly (within 72 hours) after the eruption of a political crisis anywhere in the southern hemisphere was enhanced. Continuity of collection would be essential to keep a technical base in the condition needed for emergency production. The Consolidated Cryptologic Program (CCP) allocated resources in conformity with the planned continuation of expanded coverage of Africa and Latin America.

No U.S. Sigint ship had ever been tested in war conditions. The conflict in Southeast Asia provided an opportunity for the Navy to ascertain the potentialities and problems involved. As early as February 1965, CINCPACFLT proposed to CINCPAC that two TRSs (alternating on station) be shifted to Asian waters in order to provide continuous direct service to U.S. Naval commands there. In concurring, CINCPAC added more justification as it forwarded the proposal to the Joint Chiefs of Staff.

Since the diversion of even one Technical Research Ship was incompatible with the existing and planned arrangements for producing Sigint to meet customers' requirements previously validated and accepted, the JCS formally sought advice from USIB. Should U.S. Naval resources be deployed where a Unified Commander recommended or where non-military consumers preferred?

USIB convened on 9 April 1965 at the request of its member from the Defense Intelligence Agency (DIA). The Director, NSA, had already agreed that one TRS, *Oxford*, should go in order to provide "a useful adjunct in the event we were forced to evacuate one or more ground sites" in South Vietnam. The need for a floating platform instead of a shore-based station to collect signals relevant to seaborne infiltration was considered to be nil. A ship could engage, however, in searching and developing new Sigint targets in areas not well covered, such as the southern Delta and parts of Military Region V. Until it found new tasks and while the stations ashore remained active, most collection by a TRS would necessarily be duplicative. Not one but two ships would be essential if seaboard collection was to continue during port calls and maintenance.

The diminished Sigint coverage of Latin America, Africa and Soviet space events that should be expected in case either *Oxford* alone, or *Oxford* and other TRSs, went to the Western Pacific was explained to USIB. Ultimately USIB agreed to inform the Joint Chiefs of Staff that the Board had no objections to the diversion of two ships.

Oxford and Jamestown go to Western Pacific in 1965

Evidence of seaborne infiltration by Vietnamese Communists into South Vietnam led to a blockade by U.S. Naval units, Operation MARKET TIME, which began in March 1965. On 30 July 1965 the Coastal Surveillance Force (CTF 115) was activated. Its vessels, aided by aircraft, kept watch over the waters adjacent to South Vietnam, within the three-mile and the twelve-mile offshore limits. The waters were subdivided into MARKET TIME areas that extended from the Demilitarized Zone past the mouths of the Mekong River to the Gulf of Siam south of Cambodia.

Before either ship had begun its voyage to the Western Pacific, a series of operating policy questions were considered. The ships were being permanently transferred to the Pacific Fleet, which would select a different home port for them on the western coast of the United States instead of Norfolk, Virginia. While conditions in the Western Pacific remained so uncertain, the vessels would not return to their home ports but would make port calls and undergo repairs and overhauls in Asian waters. Subic in the Philippines and Yokosuka and Sasebo in Japan were likely places for the latter. The tour of duty for personnel would be one year. Cruises in operating areas would be as long as possible and port calls as infrequent as possible within the framework of U.S. Navy Regulations. The prospect was that a ship would be in port about four weeks out of every thirteen, and instead of a twenty-one week overhaul every three years would have a six-week "availability" each year.

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Pressure would be strong for at least one port call in Hong Kong and another in Bangkok as alternatives to Subic.

Movements of the ships would be controlled by CINCPAC through CINCPACFLT and COMSEVENTHFLT. Operational and technical control of Sigint activities would be exercised by DIRNSA in communications through the chain of command to the Sigint unit on a TRS. Each would have the mission of meeting national intelligence requirements while emphasizing the continuing, validated requirements of theater military commanders. The commanders would not levy requirements directly on the ships or their Sigint units but pass them for validation to JCS/DIA. The latter would transmit validated requirements to DIRNSA, who would apply technical considerations in determining collection and reporting assignments and areas of operation. Through NSAPAC Representative Vietnam ~~(C)~~ the requirements and the areas of collection would be made known to COMUSMACV, who would advise COMSEVENTHFLT where a TRS could best work on its assigned tasks.

That normal routine could be telescoped whenever local commanders had emergency requirements, NSAPAC REP Vietnam ~~(C)~~ was authorized to receive them and swiftly to take steps essential to effect the necessary tasking of a TRS.

From 9 to 11 April 1965, *Oxford* tarried in the Gulf of Guinea to help collect telemetry signals from an expected Soviet space probe. Then she went to Capetown to have a generator repaired and, after a brief stop at Durban, crossed the Indian Ocean, passed through the Straits of Malacca and part of the South China Sea, and arrived at Subic on 3 June 1965. On 16 June 1965 *Oxford* started forth on its first cruise in MARKET TIME areas.

Oxford was equipped with 22 manned intercept positions as follows:

12 HF manual Morse
1 VLF manual Morse
1 MF/HF radiotelephone (with SSB capability)
1 HF/VHF radiotelephone
2 VHF radiotelephone [redacted] [redacted] capability)
3 radioprinter, single channel
2 Elint

Linguistic specialists aboard covered six languages: 10 for Vietnamese; 2 for Chinese; 1 for both Russian and Chinese, and 1 each for Cambodian, Portuguese and French. Of the 16 men, three were on temporary duty.

By July 1965, a JCS/NSA study of ways in which two TRSs might strengthen the Sigint support of the Seventh Fleet had disclosed four specific fields and had recommended means of supplying Sigint in a timely way. They were the following:

Weather intelligence.
Target information.
Flight schedules and take-off messages for North Vietnamese MIG aircraft.
Extension of the radar capabilities of Seventh Fleet/2nd Air Division.

An important factor in this effort would be activation of a direct circuit between USA-32 at Da Nang in South Vietnam and USN-27 at San Miguel in the Philippines, over which material could be transmitted for inclusion in the Fleet intelligence broadcast to a TRS offshore.

DIRNSA recommended sending *Jamestown* as the second TRS in Asian waters. *Jamestown* was one of the slower Liberty ships. It seemed better to retain the faster Victories to reduce times in transit between their distant operating areas and home port. *Jamestown* returned to Norfolk from a South American cruise late in July. She was then equipped with a TRS Special Communications System (TRSSCOM) and other special gear, and on 22 October 1965 started her long voyage to Subic via the Panama Canal and Pearl Harbor. On 30 December 1965, *Jamestown* dropped anchor at Subic. Soon afterward she started collection operations in MARKET TIME area 9, off South Vietnam's southwestern coast.

Jamestown was equipped with 21 positions, as follows:

11 manual Morse, of which 7 were MF/HF, 2 VLF through VHF, and 2 for manually keyed transmissions in various modes.
1 automatic Morse.
3 radiotelephone (multichannel).
2 radioprinter.
1 ESV VHF/UHF.
1 R/D for the Naval Research Laboratory.
1 VLF/SHF with demodulator and signal conversion for FSK, DFSK, On-Off-Keying, single sideboard, and independent sideband.
1 DF.

By the end of 1966 *Oxford* and *Jamestown* demonstrated their ability to collect valuable, unique traffic and to supplement (as well as to duplicate) the material intercepted at land-based stations. They lengthened their periods at sea to permit overlapping, and offset prolonged absences from home port and less frequent liberty ashore by cutting down the standard tour to one year. USN-850 and USN-853 were also available as military reserves to substitute for land-based stations which might have to be evacuated.

(b)(1)
(b)(3) - P.L. 86-36
(b)(3)-50 USC 3024(i)

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(b)(3) - P.L. 86-36
(b)(3)-18 USC 798
(b)(3)-50 USC 3024(i)

Early TRS Operations in Southeast Asian Waters

In NSA it was believed desirable to test the hearability on a TRS in the Bay of Bengal of certain important Chinese target communications, in case USA-60 later had to evacuate [redacted] and relinquish its mission. Of the shipborne platforms then operating, the choice for this special operation lay between *Oxford,* in the South China Sea, and *Liberty*, then at Capetown and scheduled to skirt the west coast of Africa and to cross the Atlantic to Norfolk. *Oxford* was selected. From 23 September to 15 October 1965, in monsoon weather, she cruised south of the Ganges Delta in the Bay of Bengal, and returned to Subic Bay at the end of October. Since the results of that effort were inconclusive, a more extended test was recommended; but it seemed certain that no TRS could ever duplicate completely the mission of USA-60.

Except for that cruise, *Oxford*'s tasks after arriving in Southeast Asia had to be developmental. Besides keeping themselves available to remedy the situation in case a shore-based station had to be evacuated, both *Oxford* and *Jamestown* had to discover how they could perform non-duplicative functions and be fully contributory to the cryptologic effort. Eventually each was able to collect important traffic not otherwise copied and to augment shore-based Morse positions. They operated under a collection management authority ashore at USM-626 (located at Saigon and later at Bien Hoa), or, when in MARKET TIME AREA 2, at USM-808 at Phu Bai. They participated with aircraft and shore-based stations in airborne radio direction-finding operations. Operators from shore stations were detailed to a TRS to assist the ship's operators in acquiring familiarity with certain targets. Whenever the TRS could tarry in one area and received ample feedback and other support, her intercept operators became more proficient.

NSA was ready to have *Oxford* moored in Cam Ranh Bay, or anchored at some other spot effective for collection, but that action was considered impracticable.

In November 1965 USN-850 obtained the initial intercept of Cambodian multichannel communications serving Military Region II. *Jamestown* (USN-853) joined in 1966 in collecting such traffic, which could not be copied from any U.S. land-based station, and which yielded significant intelligence pertaining to Cambodian Army and Navy strengths and dispositions and border and airspace violations. By test, it was ascertained that a minute percentage of the messages were also transmitted on Morse circuits as well as on VHF multichannel. In July 1966, USN-850 first intercepted Cambodian police manual Morse traffic on the same frequency used by the Cambodian police radiotelephone network. It collected unique Cambodian naval and air manual Morse.

[redacted]

When a lengthy period of technical phasing ended, the two shipborne Sigint units did not engage primarily in producing normal Sigint product to meet national intelligence requirements but instead took as a major mission the issuance of unserialized tactical reports (TACREPs), containing information that could be tactically exploited by commanders in the Vietnam war. Reporting designators reflected that situation. Shore-based stations followed up TACREPs for the purpose of meeting requirements of the national intelligence community.

Against Viet Cong targets, USN-850 made helpful contributions, though insufficient to serve as a base for intelligence items. Cruising along the coast prevented obtaining the volume of traffic from individual North Vietnamese transmitters that might have been so exploited.

Special Missions.

Late in October 1966 *Oxford* was diverted from an area off the coast of South Vietnam to collect, process, and report Sigint derived from Philippine internal communications that pertained to the security of President Johnson and his entourage during a war conference in Manila. On 21 October [redacted] from G Group, NSA, came aboard to augment its reporting section temporarily. Six days later the ship headed back to her previous area of operations, having issued 94 Sigint items. On 28 October 1966 DIRNSA praised *Oxford*'s contribution warmly in a message to the Director, NAVSECGRU.

(b)(3) - P.L. 86-36

Jamestown executed several special missions and won commendations. As mentioned earlier, she participated in a MARKET TIME Comsec operation in 1966 and another in 1969. A risky effort in MTA 1 to collect SAM-related Elint and other types of North Vietnamese signals during June and July 1967 was not repeated. She was, however, the principal collecting and processing station covering the South Vietnamese presidential election in August 1967 and legislative elections in October 1967, in each instance aided by an NSA TDY team aboard. Again, on transit to ports in Taiwan or Japan for overhaul, her NMSD position performed special tasks of high priority.

In the Western Pacific, between 21 November and 2 December 1966, *Jamestown* (USN–853) cruised from Bangkok along the coast of South Vietnam to MARKET TIME Area 2, southeast of Da Nang. There USN–853 participated in a special Sigint development project with USN–414J acting as the collection management authority and an aircraft equipped with ARDF facilities testing new procedures. If a TRS held the technical data that it needed, had an operator familiar with the area of interest, supplemented by one processor and one analyst, air-sea ARDF could be accomplished anywhere at anytime. Twenty-five ARDF fixes were made, of which *Jamestown* tipped off 15.

Oxford and *Jamestown* were used in MARKET TIME Area 9, or in search and development along the coast from Areas 2 to 9, during 1967. During December 1967 NSAPAC proposed officially to CINCPACFLT that times on-station be lengthened to 45 days, and that primary emphasis be shifted to areas 6 and 7, (nearer the mouths of the Mekong), while operations in Area 9 became secondary. The longer periods were intended to result in continuous coverage, alternating between the two ships, even though times off-station were lengthened to counterbalance. And before the two ships ceased operations in December 1969, each had become an important source of Sigint.

Experience With Oxford and Jamestown, 1966—1969

Oxford and *Jamestown* remained in Southeast Asian waters until December 1969, when they moved to Yokosuka, Japan, to be decommissioned. During their years of performance in connection with the war, they had demonstrated several important aspects of such service. Although they contributed to the total Sigint effort to satisfy national Sigint requirements, land-based stations were used to intercept low-powered tactical transmissions and to maintain continuity on them while shipboard positions copied other transmissions. The ships also provided insurance that collection could continue even if a shore-based station had to be evacuated. In fact, if it proved necessary at the end of hostilities to close stations and to withdraw forces ashore, the ships might conceivably continue Sigint operations from the sea.

Engine trouble, communications deficiencies, inability to move in response to a collection problem until too many layers of command and staff had acted on a proposal to alter the pre-arranged schedule, and other problems were common to both ships. The trend in collection management and movement control was toward increased decentralized authority in the theater of operations and greater use of the ships for tactical Sigint support.

Over-Extension of TRS Capabilities

The South American and African intercept operations to which the TRSs had formerly been committed inevitably suffered from the diversion of TRSs to the Western Pacific. *Belmont, Liberty* and *Georgetown* (when not substituting for *Muller* on the Havana station) were replacements for *Oxford* and *Jamestown.* The ability to react quickly to critical situations within the 72-hour period prescribed by USIB was lost. Erosion of the technical base gradually reduced the capabilities of any TRS that might reach an operating area from which to monitor communications during a crisis.

Late in 1966 and again late in 1967, G Group sought to restore certain African and South American coverage by obtaining a release of either *Oxford* or *Jamestown* from assignment to the Western Pacific. Not only was the effort unsuccessful but even greater inroads into African coverage occurred when *Belmont* was diverted to monitor [redacted] or to maintain surveillance of SSESS/SMIRS vessels during Soviet space events.

In short, the requirements, the planning, and the programming for Sigint production based on shipboard operations had over-extended their capabilities by devoting two TRSs to the war in Southeast Asia and undertaking to monitor space events as well as to cover South and Central America, the Caribbean and Mediterranean, and both the east and west coasts of Africa.

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(b)(3)-50 USC 3024(i)

Chapter VI

The General Pattern of Shipboard Operations

Controlling the Movement and Technical Activities of a TRS

The pattern of control over the naval operations of a Technical Research Ship and over the Sigint activities aboard her evolved from experience. The decisions governing the kinds of equipment installed on a ship and the specialized personnel assigned to her set limits to her capabilities. Those resources in men and equipment were specified in successive issues of OPINS 20, Annex A, for programming purposes. Each Sigint unit, as a "Task Element," also received its own separate OPINS in the MUSSO series. For the research operations departments and military departments they were numbered as follows:

U.S. *Oxford*	USN–850	OPINS 2850
U.S.N.S. *Valdez*	USN–851	OPINS 2851
U.S.S. *Georgetown*	USN–852	OPINS 2852
U.S.S. *Jamestown*	USN–853	OPINS 2853
U.S.S. *Belmont*	USN–854	OPINS 2854
U.S.S. *Liberty*	USN–855	OPINS 2855
U.S.S. *Muller*	USN–856	OPINS 2856

In 1968 all except that for U.S.S. *Liberty* (USN–855), which had been decommissioned, were revised. Individual OPINS set forth command relationships, mission, functions, liaison, communications and relevant numbered MUSSO instructions. The general language of the sections on mission and functions underlay the detailed tasking instructions before and during each cruise. In 1969, after a decision to discontinue the shipboard collection program except for NAVSECGRUDETs, the individual OPINS were cancelled, effective at different dates. The last was 1 December 1969.

Selecting the geographical area of operations for a cruise was a direct and specific form of control. At first that choice was made by the Navy; subsequently NSA exerted more initiative on areas to be covered and the Navy responded according to its best judgment. Ultimately, the Joint Chiefs of Staff's Joint Reconnaissance Center (JCS/JRC) in J–3, Joint Staff, acted as final arbiter of the recommendations of the Director, NSA, as accepted by the Navy.

The JCS/JRC was the element of the JCS Organization through which the JCS supervised all movements by Technical Research Ships. Because the sole mission of the ships was to conduct Sigint activities, and to do so under DIRNSA's operational and technical control, each cruise involved both sailing orders to the ship's master or commanding officer, and a Sigint operations order and specific tasking instructions to be executed by the head of the Sigint unit on board. Orders and tasking, provided before a cruise, could be amended during it, and they were issued by different authorities. The Director, NSA, recommended to the CNO that a TRS move within specified areas for reasons attributable to Sigint requirements and to technical aspects of collection. The Navy submitted proposed sailing orders to the JCS/JRC. The JCS/JRC approved, or, if necessary, modified, the orders to meet military circumstances in the areas proposed. Ship's safety was paramount.

Logistic support and Navy practice required that each ship make port calls periodically and undergo maintenance or have shipyard overhauls within established intervals. Port calls required advance notification to U.S. consuls via the Department of State. Shipyard overhauling had to be scheduled months ahead. Cruises were therefore planned by Sigint officials subject to those important practical limitations.

The scheduling of TRS cruises was a Navy responsibility. NSA indicated the areas in which it wished to conduct Sigint activities in terms as general as possible. The Navy drafted a tentative timetable for port calls and logistic visits to specified places and issued a final version after acceding as much as possible to NSA's preferences for modification. Changes to meet NSA's proposals could not normally alter the requirements of Navy practice or the timing of a visit to a specific port by both a TRS and a supply ship. The official schedule of port calls was sent by the Department of the Navy to the Department of State, which arranged the diplomatic clearances for entries by U.S. Government vessels.

Sailing orders in accordance with the decisions of the JCS/JRC were ultimately issued to an MSTS-chartered TRS by a headquarters subordinate to the Commander, Military Sea Transportation Service, Atlantic. Sailing orders to a commissioned Navy TRS came via chain of command from the headquarters of the commander responsible for naval operations in the theatre affected. In the Atlantic, that was COMSERVRON 8; in the Mediterranean, COMSIXTHFLT; in the Pacific, COMSEVENTHFLT.

The Commanding Officer of a TRS received an operations order from the Director, Naval Security Group, which stated the situation (time of departure from home port to operations area and back), mission (in general terms), execution (circumstances, security, duration), administration and logistics (reports, and special equipment aboard), and command and signal (routine, nonroutine, military command). Annex A gave the concept of operations and Annex B the communications plan.

The head of the Sigint unit received from the Director, NSA, by message a tasking document which specified the collection, processing and reporting to be accomplished during a deployment as part of the national Sigint effort. Tasking "phases" were established for long African cruises. Those phases in no way affected scheduling or actual movement of the ship; scheduling was handled by the commands, which had no knowledge of the phases. Although geographic points were designated as the beginning and end of each phase, practical consideration required that, during transition from one to another, the intercept platform blend the assignments of both until non-hearability precluded continued collection from the former. Sub-phases were established for one-time variations in tasking.

The interdependence of sailing orders and Sigint instructions caused NSA and the Navy Security Group to engage in collaborative planning and tentative scheduling long before a TRS departed from port. An NSA liaison officer accredited to the JCS/JRC helped when appropriate to bring about plans, schedules and tasks that were consonant. After the recommendations to the JCS/JRC were adoped, plans and schedules were executed.

At Fort Meade, the Assistant Director (later Assistant Commander) Naval Security Group, Fort Meade, and the NAVSECGRU liaison staff provided an increasing amount of attention to the operations of Technical Research Ships as more of them went into service and the related actions multiplied. It acted as a clearing-house of information. More and more of the personnel assigned to that office, or assigned to NSA elements, had had at least one tour of duty on a TRS. By 1966, a pool of NAVSECGRU linguists, averaging about 45 men, occupied military billets in NSA and were subject to quick reassignment by the Navy to a TRS. They might embark before a cruise began, or be flown to board a TRS in an overseas port, in order to strengthen a Sigint unit. Between voyages they worked at tasks intended to enhance their skills and fitness.

On the National Cryptologic Staff (headed for several years by RADM L. R. Schulz, USN) Naval officers familiar with TRS operations filled billets in the Plans and Program Division.

The TRSs required diplomatic clearance to enter foreign ports. When schedules of port calls were made long enough ahead to accomplish all the related preparations, a need to make some changes was likely. The temporary diversions occasioned by Soviet space events caused alterations in the timing of visits to some of the African ports, where a request to cancel one clearance and to provide another tended to draw attention to the TRS and arouse curiosity about its activities, and perhaps to impede the granting of the new request. Foreign or U.S. officials could make difficulties when previous clearances had been overlooked.

At the JCS/JRC on 22 January 1964 the general problem of diplomatic clearances was discussed by representatives of the agencies and departments involved, and in consequence, NSA sent in Comint channels to the Department of State a description of the Technical Research Ships, their subordination, areas of operations, procedures for probable visits to ports, cover stories and desire for anonymity. The Department used the material to inform U.S. Counsuls who needed to know, in 17 capitals in Africa and South America. Official schedules of port calls were submitted to the Department of State by the Department of the Navy.

The decision to send *Oxford* and *Jamestown* to the western Pacific brought them eventually under military operational control of the Commander, Seventh Fleet. NSA requested that the Joint Chiefs of Staff issue to unified and specified commanders a statement of general guidance on the purpose, nature, and concept of operations of Technical Research Ships. On 5 November 1965, JCS provided the proposed general guidance to CINCPAC and CINCLANT about TRS operations in connection with their contingency planning.

Military operational control of the ships was to be accomplished, it said, by orders from the cognizant unified or specified commander through the naval component commander to a specific Fleet or Force commander. Operational and technical control of all Sigint activities (collection, processing, reporting) on board ship was to be provided by Director, NSA (via direct communications to ships or through the Director, NSG). Assignments to collection areas would be based on signal audibility and other technical factors determined by

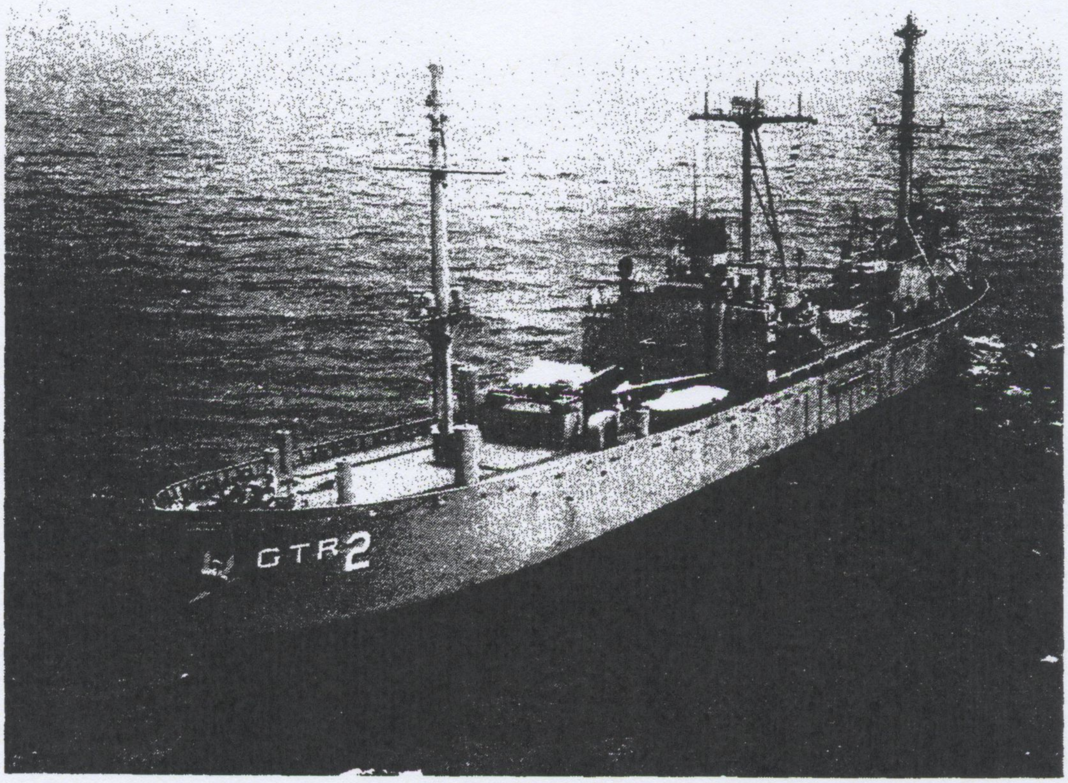
NSA to be necessary in meeting stated Sigint requirements, and on the determination by military operational commanders that the operating areas proposed by NSA were compatible with the safety of the ships. Assignments to such areas would accordingly warrant close coordination between military commanders and the Sigint tasking authorities.

Sigint support to local commanders by a TRS could be provided by DIRNSA, as he added such a supplementary mission to her primary mission, or by direct response by the TRS to requirements for immediate Sigint support, when levied by a military commander in accordance with procedures not yet established in November 1965 but being formulated. That would not alter the control of a TRS with respect to navigation or to Sigint operations on board.

Before patterns had been established by experience, the continuous direct control of the Sigint mission of a TRS from Washington was not always recognized by Fleet or Force commanders. When U.S.S. *Belmont* was diverted from its outward voyage to African waters in order to take up a station near the Dominican Republic in 1965, the U.S. Naval task force commander there ordered the ship to take off refugees from a village near the southern coast. While the ship moved as ordered, its predicament was observed at Washington headquarters, and the orders were countermanded before the refugees were aboard. A TRS was to be used solely for Sigint operations.

On 28 April 1966, a conference at the JCS/JRC arrived at a series of recommendations concerning the scheduling and operational control of Technical Research Ships. The Joint Staff, JCS, encouraged the Director, NSA; Commander, MSTS; CINCPAC; CINCLANT; and the Assistant for JCS matters, OP60B1, to carry out the recommendations of the conferees. Their proposals consisted of detailed steps for planning and reviewing TRS schedules, and identified the successive actions in routine scheduling and in making changes after approval. The differing procedures with respect to the U.S.N.S. ships (*Valdez* and *Muller*) and the three U.S.S. ships (*Georgetown*, *Belmont* and *Liberty*), operating in CINCLANT's area of responsibility would continue to be scheduled by the procedures already in effect. On 1 November 1967, these arrangements were altered.

A year later, Appendix D (TRS NICETIME) to Volume I, "Program Guidance," of JCS–SM–701–68,



U.S.S. *Georgetown*.

restated the principles and procedures. DIRNSA, after coordinating with DIRNAVSECGRU, sent recommendations for deployment at least 60 days before the start of a cruise to the appropriate unified commander (or commanders), and an information copy to the appropriate operational commanders. The latter developed schedules and sent them through command channels for review and approval. JCS/JRC approved schedules on a month-to-month basis only, although the Navy's recommendations applied to an entire cruise. Recommendations were to be sent for action to the unified commander of the theater in which a cruise would begin, and for information to the unified commanders of any other areas in which it would later operate. The commander, or commanders, were expected to plan for a whole cruise, on a monthly basis, including port calls, and to apply the principle of "maximum response to intelligence requirements commensurate with security of the ship." Eleven factors, from "current political climate" and possible hostile activities to navigation aids, obstructions, and the sea capability of each ship, were listed as applicable to security.

Tasking a TRS

In NSA, collection operations on a TRS were initially of primary interest to the Office of Collection in the Sigint Production Organization. It was a segment of the Agency which, like others, performed its specialized functions under a variety of organizational symbols.[1]

In K Group, K122 (later K18) discharged the responsibilities for shipboard Comint collection, and, in conjunction with K4, for Elint collection. The individuals in that section were equipped by experience to cope with the technical problems, both signal and nautical, with which shipboard collection abounded.

K122 and its predecessors were in daily contact with the liaison office of the Naval Security Group at Fort Meade and with the Current Operations Division of OP-94G at the Naval Security Station. They worked with the operations elements of the staff of the Sigint Production Organization and its Groups and with other elements of NSA concerning tasking and the procurement and installation on ships of various items of equipment. The Office of Telecommunications installed equipment and participated in communications planning. K122 thus became the principal point of contact within NSA for the whole spectrum of shipboard platform matters. P05, later P2 (the information and reporting element), performed similar functions with respect to Sigint-product reporting.

The tasking message for each cruise evolved from "in-house" coordination in NSA. A cruise was divided into "phases" during which the positions aboard ship were to execute given tasks under priorities appropriate to the particular geographical area through which the ship was moving. Intelligence requirements from consumers outside the Agency filtered through P05 (later P2) to analytic offices and K1 (or its predecessors), which determined whether the requirements would be best satisfied by inclusion in the collection tasks to be performed by a TRS, or should be treated in another way. Analytic offices initiated technical requirements for inclusion among collection tasks. As the potentialities of shipborne collection were first imagined and then demonstrated, many persons, if not everybody, "wanted to get into the act." Collection requirements exceeded total capabilities and had to be adjusted by negotiations. Among the analytic offices, B Group and G Group were the chief claimants. They soon developed a somewhat proprietary attitude toward a TRS with positions tasked in their behalf, and these vessels provided an increasing portion of the material on which their analysts worked. They became strongly concerned with the preservation and updating of the technical base for traffic of the target countries.

From the intelligence and technical requirements, the analytic offices, K Group, the P staff, and elements of the National Cryptologic Staff distilled what collection instructions could be put in a tasking message. The amount of cooperation involved in formulation could prolong the process. The message went ultimately to the Commanding Officer of a Research Operations Department aboard an MSTS ship and via the Commanding Officer of an AGTR to the head of the Research Operations Department on a commissioned Navy ship.

A Sigint unit on a TRS had to prepare before sailing to execute specific tasks. The minimum time to procure collateral and requisite technical aids was estimated to be two weeks. On 28 February 1964, C1 (later K1) set a deadline of one month before a ship's scheduled departure for receipt of all proposed specific tasks from the analytic offices. That deadline was not readily met, and once, a few months later, *Georgetown* actually left

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[1] Before U.S.S. *Oxford* became a TRS, the Office of Collection (COLL) had been married to signals analysis and then went under the short title of COSA. On 1 July 1961, COSA became C1 in C Group. Shipboard collection questions were the responsibility of C111. In 1965, C1 was separated from C Group and with the designator, P2, was placed directly under the Assistant Director, NSA, for Sigint Production (ADP). In 1966, the symbol P2 was shifted to a totally different element while the former P2 was redesignated and reorganized as K Group. The Branch of P2 (Collection and Signals Analysis) that in 1965 attended to the collection of Comint and Elint signals from mobile platforms was known as P212.

Norfolk on schedule before receiving a tasking document.

The Sigint units went through a stage of "technical phasing," in which they performed collection and technical processing on board ship but were not authorized to begin intelligence reporting. After emerging from that level to be tasked with a Sigint-product mission on given entities, a TRS Sigint unit issued items that met reporting criteria and forwarded other material electrically to NSA in accordance with the terms of the tasking message. Before receiving authorization for direct release of Sigint product to consumers, a unit also sent selected material electrically to NSA. Between operators and analysts aboard a TRS and analysts working the same problem at NSA, technical information might be exchanged. The men at sea raised questions and, when the arrangements were effective, the men ashore supplied technical feedback. The use of Sigint product as feedback on collection was discouraged. Other exchanges reported conditions and asked for replacement parts, more recording tape, or other items needed to execute specified tasks. Close monitoring and support of a ship's Sigint activities, undertaken in these ways, were factors in the success of any cruise.

Cruise Reports and Appraisals

The traffic intercepted by TRS Sigint units was periodically appraised by NSA's analytic offices. In the case of a first cruise or a special cruise, that voyage became the unit of assessment. For a ship at an intelligence station, like *Muller*, the unit was either a six-month or one-year period. The appraisals of *Oxford* and *Valdez* in 1962–1963 were favorable and encouraging. Appraisals exerted an influence on plans, tasks, and performance.

After the earlier cruises by TRSs had either confirmed or corrected expectations about their capabilities, and had yielded the materials of a technical base in regions and countries not previously covered, more specific tasks were in order. The configurations of equipment and the manning of intercept positions aboard some ships could be modified. Linguistic talent in a Sigint unit could be adapted to workload and reinforced temporarily by men who boarded a ship during one port call and left at another. Watches could be adjusted to meet actualities, such as the Latin American communicators' custom of shutting down for the weekend or the daily siesta. Tasking could take account of changed conditions.

In a *Shipborne Intercept Study* of 26 February 1963, written in P04, the nature of intercepted traffic was shown in some detail. Estimates written in 1964 attributed to the TRSs the collection of "unique and valuable intercept not obtainable from established, land-based activities." The ships had developed the cases assigned and had amplified a technical base in respect to numerous countries and regions, and they had been available during political crises ashore to supply material of great immediate importance.

The head of the Sigint unit aboard a TRS might at his option submit a written report to the Director, Naval Security Group. Others might confine themselves to oral briefings (along with the ship's master or commanding officer) to CINCLANTFLT, COMSERVLANT, DIRNAVSECGRU, and NSA officials. For a short time such successive oral reports were normal post-cruise activities, but, except for COMSERVLANT, they ceased when the standard pattern became better established, or they were reserved for unusual cruises.

The rather general earlier appraisals of collected traffic led to a still more inclusive Sigint Operations Review (SOR), which passed from NSA to NAVSECGRU. The latter then subjected the SOR to scrutiny by persons who had made the cruise. If discrepancies appeared between NSA's appraisal and their understanding of facts and meaning, they attempted to reconcile the differences. The outcome was an Informal Technical Critique Report to the Director, NAVSECGRU, which went also to NSA. Attention to "before-and-after" aspects of a cruise was believed to be essential to making the most effective future use of TRS resources.

During a cruise, word from Washington that the output was significant stimulated zealous performance. So did the receipt of timely technical feedback. Under conditions of stress and challenge, men disregarded their assigned periods of duty and spent many additional voluntary hours on the job. When assignments could be accomplished with the equipment provided, and at points along the ship's prescribed course, the general level of effort rose. If requests for technical support went unanswered, if tasks were not changed to accommodate unforeseen conditions which rendered planned assignments inappropriate, or if for other reasons the operators concluded that they were on their own in an ineffective operation, effort tended to diminish.

After instances in which collected traffic remained unprocessed, or the technical base had become obsolescent, and technical feedback had been lacking, P21 (later K12) in August 1965 required assurance that all material collected in response to requirements submitted by an analytic office would be processed before the relevant instructions were inserted in the tasking document.

Search and development missions along hundreds of miles of coast and near a succession of countries could be performed well only after the intercept operators had acquired a substantial familiarity with target areas and with the attributes of the communications links. "Old hands" could help newcomers. If the TRS, however, shifted from one area, in which it was prepared by experience to operate again, to another area, with which even the older operators were unfamiliar, collection was likely to suffer. Diversions from an original mission to a different one occurred frequently, as we have seen, in response to critical conditions ashore. Adjustments involved not only the Sigint crew and the operating crew but also organizations and officials engaged in control and support.

Aboard the different TRSs, analytic processing occurred in varying amounts. In part, it served technical purposes. If target signals were to be copied and others that could be mistaken for them were to be avoided, intercepted traffic had to be correctly identified. And if the ship was moving along a coast instead of remaining at an advantageous point of collection, to be useful the identification had to occur quickly, while the foreign transmitter could be heard. The heads of collection units on different TRSs recommended that shipboard processing resources be provided to meet such needs.

A much-appraised example of adaptability and usefulness was the first cruise, following shakedown and training, by U.S.S. *Belmont*. The ship left Norfolk for African waters on 26 April 1965. Next day she received a message diverting her to San Juan, Puerto Rico, to take aboard TDY personnel and then sail to an operating area off the southern coast of the Dominican Republic. There a revolution was bringing intervention by the United States to protect its nationals and by the Organization of American States to restore order. A new tasking message was sent to USN-854 on 29 April 1965. Next day *Belmont* took up her new station. On 1 May, DIRNSA established Sigint Readiness BRAVO VERANDA for the Dominican Republic and, during a period of about two days, Sigint Readiness ALFA for the rest of Latin America.

Belmont had started out with personnel, equipment and technical aids relevant to African targets. The shift to the Caribbean area involved new instructions concerning the forwarding of traffic and the processing and reporting to be accomplished aboard ship, and new technical material—papers which the TDY personnel brought with them when they came aboard on 30 April. Before receiving instructions through the welter of U.S. electrical communications pertaining to the operations of a naval task group and a landing force, *Belmont* correctly inferred what was expected of her, and after a brief period of "technical phasing" began reporting under DIRNSA's direction during the night of 4/5 May 1965. *Belmont* (USN-854) issued 399 Sigint-product reports between 5 May and 14 July 1965. At Headquarters, NSA, and Headquarters, NAVSECGRU, *Belmont's* alert response was applauded.

In addition to issuance of Sigint products, once *Belmont's* status and operating position had been established, she began forwarding daily recordings of voice traffic, microfilms of manual Morse and radioprinter traffic, and gisted transcriptions of part of the voice traffic. Daily technical summaries (TECSUMS) of manual Morse were included. The ship went inshore each morning to deliver material for courier-accompanied air transport to NSA.

Belmont's most highly valued intercept came from multichannel transmissions carrying exchanges between the rebel leaders [redacted]

After *Belmont* spent a short time in port at San Juan and another period off the Dominican Republic, the ship was directed to cover Venezuelan and Brazilian communications during the latter portion of her cruise, which ended in July 1965. She found those targets unproductive, but the flexibility of a TRS had been well illustrated by her achievements, which were summarized as an "excellent job" in the review at NSA at the end of the year.

By mid-1965, the following shipborne Sigint units had Sigint-product reporting missions:

Unit	*Ship*	*Reporting Designator*	*Area of Coverage*
USN–850	U.S.S. *Oxford*	RV[2]	Southeast Asia[2]
USN–851	U.S.N.S. *Valdez*	None[3]	Africa
USN–852	U.S.S. *Georgetown*	SJ	Cuba; South & Central America
USN–853	U.S.S. *Jamestown*	SH[4]	Southeast Asia[4]
USN–854	U.S.S. *Belmont*	SR	South and Central America
USN–855	U.S.S. *Liberty*	SD	Africa
USN–856	U.S.N.S. *Muller*	SL	Cuba

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[2] In May 1965, after African cruise, transferred to Southeast Asia from Cuban coverage. Responsibilities for Sigint product terminated.

[3] In January 1967, after refitting, *Valdez* received SQ designator.

[4] In July 1965 transferred from South and Central American coverage. After African cruise Sigint-product mission terminated.

Chapter VII

Could the Technical Research Ships be Civilianized?

In 1963, responding to concern for cost effectiveness and for reserving Navy ships and Navy personnel for "the fighting Navy," NAVSECGRU and NSA at the request of CNO considered the possibility of civilianization. That first took the form of substituting civilians for NAVSECGRU officers and enlisted men on existing MSTS-operated ships. It later consisted of converting all commissioned Navy TRSs into MSTS-operated ships. Both concepts claimed close attention and faced strong opposition.

The Use of Civilians

The use of civilians aboard *Valdez* and *Muller* raised several difficulties. After they were ready for duty, the first was that of insuring personnel security among the civilian crews, a responsibility of the Naval Security Group. All the men had to be cleared at Secret level. The ship's master, first officer and radio officer had to be cleared for Top Secret. The ship's security guards had to be drawn from the "Military (Sigint) Department." No civilians were authorized to enter Sigint working areas. The general nature of the ship's mission could hardly be masked from observant crewmen, but the specifics were reserved for the cleared and indoctrinated Sigint personnel.

Inherent in the association of the ship's civilian crew with her military Sigint personnel was a certain amount of friction and discontent on the part of the latter. In accommodations, compensation, and privileges various advantages lay with the civilians. In port, the civilians went ashore under conditions of leniency unmatched by those controlling the Navy personnel. Some of the latter always had to remain aboard ship either guarding frequencies or acting as ship's guards. The commanding officer, Military Department, could not require the master to navigate on a given course, especially if that would endanger the ship. What constituted such a danger could be differently interpreted but the final decision of necessity rested with the master. If the accomplishment of a Sigint collection task was frustrated or weakened by the way the ship was managed, friction could not be averted. Even on all-Navy TRSs it occasionally affected the relations between the ship's commanding officer and his research operations officer; the former's responsibility for the safety of his ship and position of command were paramount.

In January 1963, *Valdez* went to a Capetown shipyard for overhaul and the installation of air conditioning in living and working spaces. Plans had been made to conduct training activities ashore. During the renovation the ship was rendered all but inhabitable. The civilian crew received full allowances and found quarters in town. The Navy personnel were allowed ashore in shifts, and were housed in dormitories. Conditions on ship and in the shipyard aroused their commanding officer to an indignant description of the inequities and low morale of men in uniform. The difference between the lot of his men and that of the civilians of the ship's crew underscored these grounds for discontent.

At that juncture the Navy proposed to the Director, NSA, that civilians be found to man the intercept positions and serve as the Sigint unit on each MSTS ship.

A preliminary study, "Civilian Operators on Shipborne Sigint Platforms," was written in the office of ADMS and forwarded to DIRNSA (General Blake). The ADMS (Mr. Paul Neff) described the civilianization project as "difficult and costly but feasible." At the same time, he advised that the precedent would have such wide repercussions that it deserved analysis in greater depth, which ought to yield a "clear justification in terms of both costs and effectiveness" before NSA undertook to staff and finance a civilian collection effort.

As the subject was explored more fully with ADN (RADM L. R. Schulz) and representatives of the Sigint Production Organization, the former undertook to weigh the merits of tasking CIA, with appropriate aid from NSA, to provide civilian operators. The Deputy Director, opposing the employment of civilian operators on the MSTS ships whether recruited by CIA or NSA, recommended instead that the Naval Security Group man those ships through FY65, until they could be replaced by all-Navy AGTRs.

The Sigint Production Oganization explored one of the major administrative problems with respect to civilian career intercept operators, that of placing them in

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other billets after their tours at sea. The ADP informed the Director, NSA, that additional civilian operators who became available at the end of shipborne tours could be readily and fruitfully absorbed in various related tasks in NSA, particularly in the collection areas. In Europe [redacted] were 126 civilian billets under the existing CCP. Special tape-processing, wideband signal recovery and equipment tasks would need even more men during the next three or four years. Other projects were expected to require additional civilian operators. In view of the possibilities, the ADR recommended that NSA develop the career specialty of "Collection Technician."

ADMS produced a study on 15 March 1963 which expounded a policy of relying on CIA (1) to provide civilian intercept operators for *Valdez* and *Muller*, (2) to provide civilian operators for any other MSTS-chartered Technical Research Ship, and (3) to man stations wherever in foreign countries it was not possible to use military personnel. Informal negotiations with the CIA had revealed that Agency's willingness to consider assuming such a responsibility. When the study was forwarded to the Director on 19 March, the Deputy Director persuaded him to convene a meeting at which the proposed policy could be discussed in detail; representatives of ADMS, ADP and ADN could present their points of view, and the Deputy Director could express his own objections to the underlying policy.

General Blake subsequently adopted the position urged by Dr. Tordella that *Valdez* and *Muller* should be manned by military personnel of the Naval Security Group at least through FY65 and perhaps thereafter. He also shelved the policy of complete reliance on CIA for providing civilians at intercept stations, and he dropped the current informal negotiations with CIA. Instead, in view of the indications that more and more civilians would be needed, he instructed ADMS to prepare a study of future requirements for civilian operators, to be known as the "Requirements Program," and he adopted the policy that responsibilities for manning would be assigned on a case-by-case basis rather than under a general principle. The enlargement of an NSA force of civilian operators was accepted as inevitable. To organize Sigint community arrangements to procure civilians, ADMS was instructed to prepare what was termed an "Inter-Marriage Program" in coordination with CIA and the SCAs.[1]

By 17 April 1963 the Director had ascertained that an association of NSA, the SCAs and CIA in the so-called "Inter-Marriage Program" for supplying civilian operators would encounter too much resistance to make further study advisable. The Centralized Program of 1958 remained in force. Analyses involved in preparing the civilian "Requirements Program," which ADMS planned to fit into the format of CCP, were continued while the "Inter-Marriage Program" faded away.

Changing AGTRs to MSTS Operation

Although the Naval Security Group preferred to operate all-Navy commissioned Technical Research Ships as Fleet Units, that position was challenged by the Commander, Service Force, Atlantic Fleet (RADM J. W. Ailes, III), in November 1963 and February 1964. In view of manpower shortages, he opposed the Navy's continuing to provide Fleet Units for non-military operations, from cable-laying and scientific investigation to the interception of foreign communications. CINCLANTFLT (ADM H. P. Smith) endorsed his subordinate's views in forwarding the memorandum to the Chief of Naval Operations (Op-30). Such ships absorbed Navy billets needed for "the fighting Navy," they asserted. Their proposal to the CNO was to turn the AGTRs over to the MSTS to operate in behalf of NSA, and thus to recover the billets of the Navy crews.[2]

The CNO rejected the recommendation in June 1964, but a few months later accepted it, following the President's order to the Armed Forces to civilianize every billet that would release Service personnel for combat and combat support. On 27 November 1964 the Chief of Naval Operations directed that a systematic program be prepared for an orderly transfer to the MSTS of the Navy's responsibilities for operating AGTRs. Only if the cost of transforming an AGTR to meet civil marine manning standards was prohibitive would the Navy continue to operate it. The Bureau of Ships estimated the cost at $1.4 million per ship and the shipyard time required as four months. The MSTS concluded that it could operate the three older AGTRs, made from Liberty ships, for an annual cost of $1.42 million, and the last two, converted from Victory ships, for an annual cost of $1.56 million.

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[1] In that connection, NSA considered the establishment of a "Field Station Reserve Corps" through a register of individuals in NSA with previous service at field stations, and arrangements for them to be prepared for such work, as distinguished from their current jobs, if it became necessary to activate a field station in emergency or other conditions.

[2] The projected civilian marine manning of all the Technical Research Ships was estimated to release 800 military billets replaceable by only 348 civilian billets. It was by no means certain that the 452 military billets would remain available to the Navy, and even less that they would be available to NAVSECGRU operations.

NSA and NAVSECGRU designated members of a group to coordinate the change to civil marine manning. The Naval Security Group prepared, by Program Change Proposal action, to deal with this altered concept of TRS operations. Seven areas were each to be covered by one shipborne platform. Time on station was to be raised from 45/50 to 75/80 percent. Some configuration changes might be needed.

Early in July 1965 representatives of NSA and NAVSECGRU agreed upon a concept of operations to take effect after the five Navy AGTRs—*Oxford, Georgetown, Jamestown, Belmont* and *Liberty*—had been transferred for manning and operation under contract with the MSTS, along with *Valdez* and *Muller*. The CNO (Op-94G) would sponsor the ships and enter into the necessary contracts, and would delegate operational control of the ships to the appropriate MSTS area commanders (or if necessary to fleet commanders). Their primary mission would be to serve national and theater intelligence requirements under the operational and technical control of the Director, NSA, over Sigint activities.

On each ship the cryptologic personnel would be organized as a "Military Department" under a commanding officer from the Naval Security Group. Military command would be vested in an appropriate MSTS area commander. He would have on his staff a Naval Security Group liaison officer. The number of officers and enlisted men in each "Military Department" would be determined by the number of positions that could be installed. *Valdez* and *Muller* would have 4 officers and about 90 enlisted men; each of the 5 AGTRs would have 6 officers and from 120 to 147 enlisted men, according to its size. Their normal tour would be 12 months if away from the United States, and 18 months if their ship frequented CONUS ports. Reliefs overseas would occur at quarterly intervals if military transportation from U.S. installations near operating areas was lacking.

The priority of requirements to be met from covering target communications would determine the operating areas or deployments. There a ship would remain on-station at least 75 percent of the time, but would spend up to six days each month in a port adjacent to its operating area, if it could continue limited operations there. Certain ports would be designated as points of logistic support or limited upkeep; they would be visited as needed. Major overhauls would occur only in continental U.S. ports or approved alternatives in order to assist the U.S. Government in meeting its outward goldflow problems, and would come at intervals of from two to three years. Periods of maintenance or upkeep would total four weeks each year. By remaining on-station for an extended period of productivity, a ship might waive goldflow restrictions on expenditure for limited maintenance or upkeep, or for the replenishment of various supplies.

The seven target areas with their approved ports would be as follows:

East Coast Africa	Capetown
West Coast Africa	Capetown
East Coast South America	Panama
West Coast South America	Panama
Cuba	Port Everglades
Southeast Asia	Subic Bay (Philippines)
Mediterranean	Gibraltar/Rota (Spain)

DIRNSA would exercise routine operational and technical control of the Sigint activities of the Military Departments, and the Director, NAVSECGRU, would exercise management control. On the basis of DIRNSA's specific tasking requirements, the Director, NAVSECGRU, would formulate operating schedules, which the MSTS area commander would promulgate. During cruises, the master of the vessel was to be responsive to recommendations by the commander of the Military Department that minor and immediate changes be made in a schedule in order to enhance the performance of the primary mission within the limits of ship's safety.

Converting the AGTRs for MSTS operation would result in releasing part of the areas previously used as quarters for military personnel. That would allow more per person, while still reserving space to improve habitability. Costs of conversion were estimated at $1,400,000 per ship plus $300,000 for US. Coast Guard and other certifications, and additional sums for necessary changes in electronic installations. CNO (Op-94G) would be responsible for protecting the security of the ships during conversion. Before being signed on, each member of the civilian crew would have to be cleared to at least the Confidential level; costs of the screening would be ascribed to the MSTS contract.

The work of converting the AGTRs would be so scheduled that existing resources were available for use against assigned targets to the fullest possible extent.

Modifying AGTRs for "Civil Marine Manning"

The plans to transfer the Technical Research Ships from Navy to MSTS-civilian crews and to modify the ships so that accommodations for civilian marine crews met MSTS standards ran into difficulty late in 1966.

On the assumption that the ships would be carrying crews and Sigint units of specified numbers, NAVSECGRU obtained from the Bureau of Ships an estimate of costs to convert the five TRSs already in service. In April 1965 the computation came to $8 million. In a Program Change Decision of 21 October 1966, the Secretary of Defense approved that expenditure during FY68.

The numbers to be accommodated at sea expanded, however, from 30 officers and 707 enlisted men to 35 officers and 778 enlisted men. Other bases for the $8 million figure were also altered. Within four months of the approval, it became apparent that the assumptions and considerations upon which the Secretary of Defense had acted were erroneous, and that the scheduling, funding and personnel allowances previously programmed had ceased to be feasible. A Program Change Request would have to be submitted.

Revised estimates totaled $28.7 million, attributable to increased manning (both MSTS civilians and NAVSECGRU military), improved conditions for the Navy personnel, high standards of comfort applicable to living quarters for MSTS civilians, inclusion of automation features, costs of certification by the U.S. Coast Guard, and "normal" increases in all costs by inflation during the intervening months.

With an embarrassing discrepancy of more than $20,000,000, NSA and NAVSECGRU had to decide whether to try to obtain more money, or to make the $8,000,000 go as far as possible, or perhaps to drop the project. The amount available would pay for the modification of *Belmont* and *Liberty,* the two AGTRs converted from Victory hulls. An elaborate analysis of the dollar cost per productive day made at Headquarters, NAVSECGRU, by an *ad hoc* study group favored that course. In January 1967 both agencies were ready to seek OSD approval of spending the money to convert those two AGTRs, one during fiscal year 1968 and the other during part of that year and part of the next.

On 13 June 1967, The Secretary of the Navy submitted to the OSD a formal Program Change Request, however, for 18,200,000 more with which, during fiscal years 1968—1970, to convert all AGTRs for MSTS-chartered operations. The OSD, realizing that the intelligence requirements to be met by shipboard operations would not diminish, advised the Secretary of Defense that all AGTRs should remain all-Navy until the whole CCP for FY70 could be reviewed. On 7 September 1967, a Program Change Decision based on acceptance of that advice terminated the effort to change the status of the AGTRs.

Beginning on 1 July 1967, by agreement between NSA and NAVSECGRU, *Valdez* and *Muller* ceased to be budgeted by NSA and began operating under the Naval Communications Funding Program. The Military Sea Transportation Service and the Commander, Naval Communications Command, on 9 August 1967 entered into a formal agreement concerning their respective responsibilities for the two ships, arrangements paralleling those previously existing between NSA and the MSTS. NSA furnished equipment for 16 collection positions on *Valdez* and 15 on *Muller.*

Valdez obtained her shipyard overhauls at Capetown, South Africa, for about six years after leaving the United States, and thereby escaped long periods in transit across the Atlantic. *Muller's* shipyard periods did not require lengthy transit from her Cuban station. Thus each was enabled to maintain a higher average time in Sigint operating areas.

A common standard for measuring the effectiveness of the two types of TRS was lacking. Usually missions differed enough to undermine a comparison. The T–AG *Muller* and the AGTR's *Oxford* and *Georgetown* each kept station at times off Havana. Any differences in output could be traced to configuration, personnel, and training rather than to type of ship. Several TRSs were diverted at various times to listen from designated points for signals related to Soviet space events. The AGTRs were able to execute such missions more effectively than the T–AGs only in the case of the faster Victory-ship type—*Belmont* and *Liberty*—which were better able to reach the assigned stations within the period of tip-off.

Visits to foreign ports were usually times when a TRS had to suspend collection, telecommunications and electrical processing. Only CRITICOMM messages with flash precedence were received. An AGTR as a public ship of the United States Navy was received in a foreign port with a certain amount of protocol. Usually an MSTS-operated ship had to obtain advance permission to enter. To guarantee that TRS visits would be acceptable to local authorities the Navy depended upon the U.S. Foreign Service to make arrangements. The men might be required to wear civilian clothes while they were on shore leave, but then incidents during which they were disclosed to be military personnel could cause embarrassment.

The TRSs that operated off the shores of Africa used South African ports—Capetown, Port Elizabeth, and Durban—inconspicuously. On 4 February 1967, however, the large aircraft carrier *Franklin D. Roosevelt* steamed into Table Bay Harbor at Capetown after an earlier announcement of the impending visit had aroused a tempest of objections in the United States. Because of the political clamor at home, all of the carrier's crewmen were denied shore leave in Capetown. The ship abruptly confined her visit to refueling and left. And although refueling in port was considerably less expensive than at sea, eventually the Navy was compelled by U.S. foreign policy to put South African ports out of bounds for U.S. Navy vessels. The consequences were injurious to the operations of some seaborne platforms, particularly *Valdez*.

Loss of South African shipyard support of U.S.N.S. *Valdez* crippled her to the point of grave inefficiency. From January 1964 to November 1967 the Department of State had caused restrictions on over 20 reconnaissance missions, and the decision that Capetown could no longer be used by *Valdez* cut back her coverage by an estimated 25 percent.

Several other ports previously used by ships with missions against Sub–Saharan African targets became unavailable because of internal conditions or of political relations with the United States. The results were hampering and the prospects were that restraint on the U.S. Sigint effort would grow rather than shrink.

In short, shipboard Sigint collection suffered not only from competition for funds and from soaring costs but also from conditions that diminished effectiveness and moderated demand. Otherwise, the relinquishment of overseas land-based sites at the end of the 1960s might well have strengthened insistence on expanding seaborne operations.

Comparison of the Cost Effectiveness of AGTRs and T–AGs

The years of experience with the two types of Technical Research Ships permitted attempts to compare costs and productivity. Establishing costs drew an accountant into gray areas. Determining effectiveness stubbornly evaded complete success. Certain factors were considered: The MSTS-chartered TRS cost less than the AGTR to convert from a transport to a Sigint ship, and carried a smaller ship's crew; its Sigint unit spent more time at sea; both types were expensive to operate. NSA paid the MSTS more than $1,000,000 per year for operating each T–AG, including *Robinson* as well as *Valdez* and *Muller*. The AGTRs could each be assumed to have cost much more than the T–AGs to run.

Part of the greater time in port spent by AGTRs could be attributed to the frequency and thoroughness of shipyard maintenance, which drew the ships away from operating areas. The general pattern included two months in port at times of turnover, while deployments were about four months in duration. Part of the time in port reflected the conditions aboard ship. The crews of AGTRs did not benefit from habitability features aboard ship as generous as those provided for the civilian crews of the T–AGs. They needed opportunities to "see the world," spend some money, and temporarily have the sense of choosing what they would do. They visited different ports in succession whenever that could be appropriately scheduled.

Both types of ships were apparently subject to engine, boiler or generator failures during deployment. The Liberty ships, *Oxford, Georgetown* and *Jamestown*, grew more and more difficult to keep in good running order throughout a deployment.

Chapter VIII

TRS Special Communication System (TRSSCOM)

The Problem

Communications between a TRS and control centers ashore provided many difficult technical problems. The ships could usually hear and respond to Navy broadcasts but parts of their operating areas were subject to extremely unreliable radio-wave propagation conditions and to a degree of humidity that hampered the performance of equipments. The general-service communications pertaining to management of the ships employed methods standard throughout the U.S. Navy. A TRS, using HF radio frequencies assigned to it by the Naval communications station nearest to its operating area, communicated through shore-relay facilities with Washington. Sigint communications followed the same routes. A major handicap to intercept operations, anticipated while Technical Research Ships were only a concept, was the interference (RFI) by a ship's own HF transmissions. Re-radiation could be troublesome on some vessels.

A ship's signals revealed its position to radio-direction finders. A world-wide crowding of the HF spectrum caused radio interference by other transmitters and facilitated either accidental or deliberate jamming. The capacity of a ship's HF transmitters was often inadequate for the volume of intercept material deserving electrical return to the Washington center and of the Sigint products to be distributed to eligible recipients. Courier deliveries ran well behind, sometimes weeks behind, the date of interception.

The ship on the Havana station could transmit by on-line encryption over HF radioprinter channels to USN-834 (Key West or Homestead) and be patched through to NSA, Fort Meade.

The other TRSs subsequently reduced their communications handicaps by a TRS Special Communications System (TRSSCOM), which used the moon as a passive relay point. Microwave signals between ship and shore terminals were bounced off the moon, and despite considerable loss in a signal's strength and a delay of more than two seconds, that system had many desirable features. On 25 February 1964, *Oxford* at sea entered the CRITICOM network by moon relay in an on-line, encrypted radioprinter channel, and thus demonstrated to doubters the worth of this type of communications technique.

Late in 1959, Navy communicators had begun using a radioprinter circuit between Wshington and Hawaii via moon relay. To apply such a method to communications with S-band signals (1700–2400 MHz) between a fixed and a mobile terminal aboard a ship at sea involved technological problems of a nature to daunt even adventurous pioneers in such matters. Scientists whose prestige with the Director of Defense Research and Engineering (DDR&E) was high, advised him that such a project was impractical. Accordingly, research-and-development funds for it were denied unless the scientists could be shown to be mistaken.

At Headquarters, NAVSECGRU, CDR William Carlin White, USN, took a more confident view of the possibilities and in February 1962 began efforts with the Naval Research Laboratory (NRL) to develop a communications system using the moon to reflect microwave signals between two points on earth, one on land and one on a ship at sea. In April 1962 the program was described in a briefing at NSA. Later that year, NSA promised support and urged the Naval Security Group to give the problems "dynamic, continuing attention." The Naval Security Group obtained management control of the Navy facilities being used between Washington and Hawaii, and received a windfall of 10-kilowatt transceiver systems when they were released by the Air Force after deactivation of the so-called "Texas Towers" on which they had been used.

Some equipment was used to establish a test circuit between *Oxford* and USN-22 (Cheltenham, Maryland). On the ship the antenna was placed on a modified gun mount on which control of azimuth and elevation was designed for naval guns and not for an antenna working best when aimed almost vertically. After accomplishing exchanges between Cheltenham and U.S.S. *Oxford* as she lay near shore, CDR White arranged to continue the tests during *Oxford's* next cruise. The system then needed adjustments and repairs before it would operate while moving over the open sea, but on 25 February 1964, it achieved the triumph mentioned above. Two days later

Oxford began daily operational use of TRSSCOM. The equipment had passed more or less from engineers to communicators.

The TRSSCOM system permitted communication by signals that not only avoided interference with the ship's passive mission but also evaded interception. Operating TRSSCOM, however, was not free from problems. The parabolic reflector antenna had a diameter of 16 feet and required manual control for correct aiming. The hydraulic system could break down. Sighting on the moon when it was obscured by cloud cover required calculations and skill. The earth's motion and the ship's position at sea affected the portion of a twenty-four hour period when the moon was available as a passive relay. On *Oxford* and at Cheltenham, a 100 word-per-minute printer system was used, limiting the rate of transmission and reception to the capacity of that single-channel system. For a complete system usable by ships in the southern hemisphere or far northern latitudes, the installation at Cheltenham would not be sufficient. But on 17 July 1964, the CNO approved the TRSSCOM for *Belmont* and *Liberty*.

The System

During 1964, a TRSSCOM Committee at NAVSECGRU developed plans for a full duplex, world-wide system linking all Technical Research Ships with Sigint authorities through four shore facilities, one in each of the earth's quadrants. On 3 June 1965, that Telecommunications Program Objective was officially endorsed by the Department of the Navy, subject to budget review and approval by the Department of Defense. Subsequently, changes were made in the particular sites proposed for shore stations. Besides Cheltenham, Maryland, one was installed at [redacted] another at Wahiawa, the Hawaiian Islands, and the fourth, [redacted]

[redacted]

While *Belmont* and *Liberty* were still being converted for service as TRSs, installing TRSSCOM apparatus on them was found to be impossible without postponing their shakedown cruises. Before the big 16-foot antennas could be mounted, other installations had to be adjusted. The ships could take the added weight topside without harm to stability and trim, but the time required for installation made it seem better to plan to do it in two stages, completing the second when the ships came into port for a first overhaul. The installations were scheduled for the spring and summer of 1966, and were actually completed early in 1967.

On the TRSs, the Navy substituted for the modified gun-mount first used on *Oxford* an "X–Y base" which permitted more complete aiming of the dish antenna. Since new TRSSCOM equipment was so expensive, installation on the five AGTRs and one of the T–AGs was scheduled over several years. (*Valdez* was the only T–AG selected, and did not receive the equipment before being inactivated, while *Muller* continued to use other communications facilities that were already serving it satisfactorily.) The equipment on hand, however, enabled the TRSSCOM system to go into operation earlier than at first planned. The station at Wahiawa was ready to work with *Oxford* and *Jamestown* soon after their transfer to the Western Pacific in 1965. All AGTRs were equipped in 1966 and 1967.

The Defense Communications Agency did not participate in the development of TRSSCOM. Since the system's 84-foot dish antennas ashore provided marginal excess capacity not needed for Sigint communications, fifteen extra channels were released to the Defense Communications System for uses which did not interfere with TRSSCOM. Similarly all TRSSCOM facilities were made available to engineers engaged in developing a Microwave Space-Relay System (MISER), provided the tasks to be performed did not interfere with the primary TRSSCOM mission.

In the future when the Defense Communications Satellite System became usable, the Sigint community might prefer its 24-hour availability to the fewer hours per day in which moon-relay communications could function. To make the change, TRSSCOM equipment would then have to be adapted to frequencies in the X-Band.

On 12 April 1967, DDR&E proposed to DIRNSA that TRSSCOM facilities (shipborne terminals and shore stations) be replaced during fiscal years 70–71 by facilities that could work with active satellite repeaters in the forthcoming Defense Communications Satellite Project (DCSP). In anticipation, immediate savings could be accomplished by reducing the TRSSCOM procurement scheduled for fical year 1969. DIRNSA in reply enumerated some of the objections to such a risk. The DCSP was an uncertain means of communication for the TRSs and had certain limitations stated by its sponsors. It would provide fewer channels (at 100 words per minute) per ship, be less available than TRSSCOM in polar regions, subject the ships to competing claims on shore terminals, substitute for the reliable moon in a passive role the less reliable satellites in an active capacity, and satellites even less available under certain conditions. When the DCSP entered its Phase III, the equipment in the interim system would have to be modified, and that would necessitate more investment.

In view of those considerations, DIRNSA believed a decision to abandon the investment in TRSSCOM in

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FY69 would be premature. Instead, the program for FY69 should be executed as planned. When the existing ships were replaced, equipment for use with the DCSP could go on the new ships and TRSSCOM equipment could be transferred for use as back-up communications. On 6 May 1968, NAVSECGRU's TRSSCOM Program Committee reported that its mission had been accomplished.

First tests of the DCSP with shipborne terminals were unsuccessful. [redacted]

During 1969 a course of training in TRSSCOM maintenance was conducted for the last time as the system itself was placed in caretaker status beginning in October.

Chapter IX

The Impact of Another War: U.S.S. *Liberty*

Liberty's Last Cruise

Liberty left Norfolk on 3 May 1967 for another cruise along the western coast of Africa. As she neared Africa, the United Arab Republic (UAR) on 14 May went on full military alert. A few days later the United Nations screening force between the UAR and Israel was withdrawn in response to the insistence of President Nasser of the UAR. Egyptian ground forces then took positions in apparent preparation for war with Israel. On 23 May, when *Liberty* was at Abidjan on the Ivory Coast, DIRNSA raised the level of an existing Sigint Readiness condition and expanded it to include the entire Middle East. On the same day he proposed to the JCS/JRC that *Liberty* be directed to depart Abidjan immediately and proceed at best possible speed to Rota, Spain, to take aboard personnel and technical support material, and then to sail to an operations area near Port Said.

Liberty thus shifted from a "continuity task" to a "quick-reaction task," the exact substance of which was developed during her northward course to Rota. Some of the personnel and technical support material taken on board there had just been left for her by *Valdez*, which continued across the Atlantic to undergo major overhaul. At Rota, also, *Liberty* passed from control by CINCLANT to that by CINCEUR through CINCUSNAVEUR, and, beginning at midnight 6/7 June 1967, by the Commander, Sixth Fleet.

On 29 May 1967, as *Liberty* was passing along the coast of Morocco, DIRNSA sent directly to her commander a revised, interim tasking message. It was to be supplemented when the ship had attained hearability range of UAR targets. Execution of interim tasks was not intended to cause any delay or diversion from arriving as quickly as possible on station in the eastern Mediterranean.

On the same day DIRNSA proposed to JCS/JRC that five operating areas in the eastern Mediterranean be approved for U.S.S. *Liberty*, of which area No. 3—32:00N–33:00 to 34:00E—would be used until the ship received further notification. The specific operating areas and the closest points of approach would be subject to adjustment for reasons of safety and operational necessity.

The JCS/JRC revised *Liberty's* schedule for June and her track from Rota to the operating area, restricting closest points of approach to waters outside the limits claimed by each country for its territorial waters. Shortly before *Liberty* came under command of Sixth Fleet, her commander was warned:

> In view present Arab/Israeli situation and unpredictability of UAR actions, maintain a high state of vigilance against attack or threat of attack. Report by flash precedence any threatening or suspicious actions directed against you or any diversion from schedule necessitated by external threat. Advise if local situation dictates change in area of ops assigned. . . . Submit reports of contact with ships, aircraft and submarines which are unident[ified], hostile, of intell[igence] interest or engage in harassment. . . . Emergency Plan Charlie now in effect in Sixth Flt . . . .

As *Liberty* closed with her zone of operations, G Group at NSA requested that her operating area be shifted westward from operating area No. 3 as previously specified to area No. 2, for which the coordinates were 32:00N–31:00 to 33:00E instead of 32:00N–33:00 to 34:00E. The JCS/JRC was asked to initiate immediate action to effect the change. *Liberty*, as instructed, reported that her position at 0800Z 7 June 1967 was 33:06N–28:54E, and that she would move to a station within 30 nautical miles of 31:45N–33:30E. The JCS authorized *Liberty* to vary operating areas according to local conditions provided the closest point of approach to the UAR was 20 nautical miles and to Israel, 15 nautical miles. Two carriers of the Sixth Fleet had operated in the region south of the western end of Crete during the preceding days, but none of their aircraft went within 100 miles from the coastlines of Syria, Israel or Egypt, or 25 miles from Cyprus. No flights were scheduled for either 7 or 8 June. During the night of 7/8 June the JCS revised its instructions on the closest allowable points of approach by *Liberty* to Syria, Israel, Egypt, and Cyprus to be the same limits set by Sixth Fleet for its aircraft. Had orders to that effect from COMSIXTHFLT reached *Liberty* promptly, the ship would have had to withdraw northwestward. But the message was never received or acknowledged and no compliance was reported.

NSA had recommended areas for *Liberty's* collection operations so close to the coastline because there, and only there, could her receivers acquire the low-powered line-of-sight VHF/UHF signals of UAR military communications links. The audibility of UAR signal paths had been ascertained to be sufficient at 12.5 miles from shore but not much farther. Orbiting ACRPs could intercept the desired traffic from greater distances but were limited to a maximum of five hours before they had to turn back to base. *Liberty* was therefore the only vehicle equipped and manned to cover otherwise unavailable sources, provided she remained near enough to them. She was wholly unable to defend herself from bombs and torpedoes.

The war between Israel and the UAR had erupted with sudden ferocity while *Liberty* was sailing from Rota to the vicinity of Port Said. The Israelis destroyed the Egyptian Air Force and swept to the Suez Canal, demolishing opposition. They seized positions from which the UAR had tried by artillery to block access to Israel through the Gulf of Aqaba.

At 1252Z on 8 June 1967, *Liberty* flashed a report that she had been attacked by both aircraft and torpedo boats, and that a torpedo had struck amidships. She was listing badly from a hole 36-feet wide. Before U.S. aircraft from the carriers *America* and *Saratoga* could come to her protection, the Israeli Government reported that the attack was accidental, and accepted responsibility. The problem then was salvage, not protection. The damage had been done.

After having first been reconnoitered by a jet aircraft at 0850, *Liberty* was twice again circled at intervals of more than an hour, and after another lengthy interval, was approached by three small surface craft observed on radar at a distance of 32,000 yards. About fifteen minutes later an aircraft passed along the slow ship's track and struck her on the port side, amidships, with a bomb that started a fire in an oil storage area. Two or more aircraft followed with a series of strafing, rocket and incendiary runs, setting several major fires and killing more than ten, while others were critically wounded and died later. Although a large American flag replaced one that had been shot away, the ship was attacked by three motor torpedo boats which fired machine guns and torpedoes. One torpedo hit the starboard side amidships, and over 20 men died from that blow and from the strafing fire. Before the boats left, one signalled in English, "Do you need help?" As they left, two Israeli helicopters repeatedly passed around and over *Liberty*.

While the ship limped slowly away, damage and flooding being controlled and steering being achieved by hand from the stern, another Israeli helicopter appeared. It apparently sought to lower a passenger to the deck but the ship's commander considered that too hazardous. Attempts to communicate were unsuccessful. When the helicopter dropped a message written on the card of the U.S. Naval Attache at Tel Aviv, asking "Have you casualties," efforts to indicate that there were many seemed not to be understood, even though many must have been visible to anyone in the helicopter. The Israeli aircraft then departed.

Liberty restored a single voice circuit and headed for Crete. After a rendezvous with destroyer escorts and a tug of the U.S. Sixth Fleet, and a decision to go at once into dry dock, she changed course to Valetta, Malta. Papers both classified and unclassified sloshed out through the gaping hole in the ship's hull from the Sigint operations area where the torpedo had exploded. The escorts followed in *Liberty's* wake, day and night, collecting all they could and tearing up the rest by propeller action. On 14 June 1967 she entered the harbor bearing obvious scars. After a few hours, she was dry-docked with a large canvas mat covering the hole. Pumping caused more papers to wash out into the dock, where they were collected for destruction. In the debris of the damaged area, soaked in oil and water, the remains of twelve men were found. A few remained unaccounted for and were presumed dead. Thirty-four had died and eleven had been severely wounded.

Precautions and controls to prevent breaches of security had been administered by a special task force headed by RADM H. A. Renken, USN, from Headquarters, CINCLANT. Personnel from Headquarters, NSAEUR, were present for the drydocking and to help the two surviving NSA employees as needed. (Mr. Alan Blue, the other NSA employee aboard the *Liberty*, perished without trace.) A Sigint Equipment Survey Team found all cryptologic facilities on two decks destroyed and those on a third badly damaged. The ship itself was patched up and taken to the United States for possible restoration.

Investigations of the Incident

The tragedy raised questions concerning the methods of command and control, the responsibility for *Liberty's* being deployed in a war zone, the conduct of the ship's commander and crew, the compromise of Sigint material, and the reasons for the attack. The Director, NSA (General Carter), appointed an *ad hoc* Mid-East Information Group to assemble pertinent information with full documentation and prepare a report. The JCS named a special team, headed by Maj. Gen. Joseph R. Russ, USA, then Chief, Joint Command and Control Requirements Group, OJCS, to ascertain what had gone wrong within the JCS system of command and control. The Navy created a special task force headed by Rear Admiral H. A. Renken, mentioned above, and a Court of Enquiry.

Instructions to General Russ's team charged it with investigating the means used to issue and transmit operational directives to the commander of the U.S.S. *Liberty*, and with reviewing the specific orders issued to *Liberty* between 1 and 8 June 1967, and the specific orders to which she responded. The team was directed to consider the circumstances attending any conflicting directives, and inordinate delays in the receipt of messages or other proper orders, or their non-receipt. The investigation was not to infringe upon the province of the Navy's Court of Enquiry. It was to report to the JCS.

General Carter instructed his Deputy Director, the Assistant Director for Production, and the Assistant Director for the National Cryptologic Staff to insure that NSA provided "total, uninhibited access and cooperation with this team to include any compartmented or highly sensitive information if it has any bearing on the problem." On 12 June 1967, when General Russ and two members of his team responded to General Carter's invitation to consult at Headquarters, NSA, the Director briefed them in his office and loaned to General Russ a copy of the report already submitted by the Mid-East Information Group.

The briefing and the report distinguished the record of DIRNSA's operational and technical control of Sigint activities aboard *Liberty* from that of the operational command and control of the ship's movements, in which he had consistently deferred to the military judgment of the JCS/JRC. The latter had well understood on 7 June 1967 that *Liberty's* Sigint mission, the reason why she had been diverted from African to Eastern Mediterranean waters, could not be executed if her closest point of approach (CPA) to the coast of the United Arab Republic was within range of protective support by units of the Sixth Fleet. As *Liberty* neared the war zone the JCS/JRC decided that her CPA to the Israeli coast should be 15 nautical miles and to the UAR coast, 20 miles. Later that day, the fact that the U.S. Ambassador at the United Nations had declared that no U.S. Navy ships were within 350 miles of the combat area caused the JCS/JRC, with NSA's concurrence, to cancel the earlier CPAs and widen them to 100 nautical miles from Syria, Israel and Egypt, and 25 miles from Cyprus. Messages conveying the revised instructions made their way along the chain of command and emerged in the morning message from COMSIXTHFLT to U.S.S. *Liberty*.

General Russ's team went to all major headquarters involved. Eventually it could be said that that critical message was not relayed to *Liberty* via a NAVCOMMSTA Asmara broadcast until 1525Z on 8 June, after the Israeli attacks.

The Naval Court of Enquiry was impressed by the performance of CDR William L. McGonagle, who had been wounded, in directing control of damage, care of casualties, maneuvering and sailing during the aftermath of the attacks. The ship was saved and brought to port on its own power, an accomplishment that reflected great credit on the ship's Navy personnel and the quality of its training, discipline and leadership. CDR McGonagle was promoted to Captain and awarded the Congressional Medal of Honor in ceremonies on 11 June 1968.

In Israel, an armed forces board investigated the actions by its air and naval units in attacking *Liberty* and on 17 June 1967, concluded that the assault was neither malicious nor an instance of criminal negligence but simply an innocent mistake to which certain actions by *Liberty* had contributed. The reasons given were inconsistent and the findings unconvincing. The U.S. Government accepted an official apology and an offer to make amends.

In the judgment of NSA officials, U.S. Sigint material had not been compromised. The tug, *Papago*, had picked up some classified documents from the sea, most of them being [redacted] TEXTA. At P2's request, C5 made computer searches of about three million records and found that only 24 of them had been aboard the *Liberty*. Conditions in the torpedoed area made individual accounting impossible. NSA made an informal report to that effect to the Sigint Committee of USIB.

"Lessons Learned" from the Liberty Incident

Following the *Liberty* incident, the JCS, Naval Security Group, and NSA endeavored to avoid another with similar consequences. The JCS drafted and published SM-722-67 defining the "Policies and Procedures on the Control and Scheduling of Technical Research Ships." Meanwhile the Naval Security Group first compiled a report that identified 32 different problem items, discussed them succinctly, and proposed appropriate measures to deal with them. It then entrusted the report to an *ad hoc* committee which convened frequently during the remainder of the year to propose "the corrective, follow-up actions required."

The *ad hoc* committee considered carefully how best to reconcile Sigint tasking with command and control of Technical Research Ships. It recommended that

SM–722–67 be amended to reflect the primary responsibility of the JCS/JRC to issue withdrawal orders to Technical Research Ships when emergencies arose because of political or strategic considerations, while not relieving subordinate commanders of their responsibility to take action necessary to preserve the safety of a ship in a dangerous tactical situation.

Mindful of the limited awareness in the Sixth Fleet of the presence or mission of U.S.S. *Liberty,* the *ad hoc* committee recommended ways of insuring that future cruises would be planned, scheduled and executed while NAVSECGRU officers were in a position to advise others concerned with command and control. Moreover, they recommended that NSA be encouraged to parallel each general service (GENSER) message to the JCS requesting a diversion of a TRS with a Comint message that detailed to affected commands the Sigint objective of the diversion. The procedures set forth in an amended SM–722–67 should permit the originators of messages to select and transmit a limited number of high-precedence messages identified for dual handling over Sigint channels as well as normal fleet broadcasts.

The committee submitted its report to the Director, NAVSECGRU, took note of his comments, and assigned each of the recommendations, as approved, to NAVSECGRU departments for action. The Inspector-General, NAVSECGRU, was requested to monitor the subsequent execution. Among the recommendations were provision, in emergencies, of 24-hour watch and situation reports, of information about personnel aboard TRSs, cover stories, reduction and control of the classified documents aboard the ships, destruction facilities, identifications of damage and of casualties, reconciliation of tasking and command and control procedures, improved communications plans for TRSs, and for dealing with incidents, the use of weighted bags, and the reservation of positions and personnel to furnish early warning (direct support) to TRS commanders.

The Director, NAVSECGRU, submitted a request to change SM–722–67 along the lines recommended by his *ad hoc* committee.

Inventories of documents aboard the TRSs showed that at least four ships held many that were not needed for the area or mission ahead of them. DIRNSA furnished guidance for greater care in listing and restricting technical materials to documents needed for current activities.

Certain aspects of the *Liberty* incident were of prophetic importance. It revealed that deficiencies in communications, unless remedied, might not allow future control or support to be sufficiently close. It showed that a TRS could be so discredited by invidious description as a "spy ship" that the United States public and its Government would not insist on U.S. rights in international waters to the extent of supporting strong retaliatory action. Protection of a TRS would depend thereafter upon the proximity of powerful supporting elements of the U.S. Armed Forces rather than on deterrence caused by fear of ultimate retribution. After the attack on *Liberty*, the ship on the Havana station was first recalled and then escorted while on duty.

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Chapter X

Could Small Ships Relieve the Shortage?

While Sigint requirements grew, cover broadened, a general pattern of shipboard operations evolved, and a drive to achieve maximum cost effectiveness brought out several problems—the Technical Research Ships were aging. They would have to be replaced during the 1970s, and in the interim, they were exploited to the full. Two were committed to operations in Southeast Asian waters. A third kept Cuba under Sigint surveillance and supported the CINCLANT Caribbean Advisory Warning Plan of air reconnaissance.

Of the other four, one was in need of drastic rehabilitation and improved configuration. Another had to be scheduled each year so that it could relieve *Muller* at the Havana station for about a month. When free for other tasking, *Georgetown*, along with *Belmont* and *Liberty*, had to cover the Caribbean and Central America, the coasts of South America, the Mediterranean and the rest of Africa, and move out to positions at sea from which to hear and collect signals from space events and [redacted] Then *Liberty* was put out of business, though for a few months hope of restoring her to active service persisted.

Rehabilitation of Valdez in 1967

Valdez, the first MSTS-chartered ship, had been hurriedly converted for TRS operations. It was necessary to adjust and improve her collection and communications facilities repeatedly. By the end of 1966, the vessel was ailing, and USN-851's operations suffered from her condition. A Sigint operations review, a NAVSECGRU critique, and an inspection in port during 13–17 December 1966 led to NSA's sending a three-man team to Mombasa in February 1967 to consider the feasibility of making certain major alterations.They discussed needs and possibilities with the officer then commanding *Valdez*'s Military Department (LCDR W. E. Dyer) and three other officers of USN-851. LT A. J. Wilcox (G42) represented NAVSECGRU.

The team concluded that certain Sigint tasks that USN-851 should perform could not be accomplished for lack of proper equipment or necessary manpower. The ship's divergences from the standards of position configurations, they realized, were for the most part caused by equipment shortages. Necessary reconfiguration was of such a character that they recommended that it be done in the United States rather than at Capetown. Not only did the living and operating spaces within the hull need to be modified; working space for processing and reporting also had to be enlarged. More equipment for collection and Sigint communications was needed, in addition to that which had to be replaced.

After more than five years away from the United States, *Valdez* was thereafter scheduled to return in 1967 via the Mediterranean for a major renovation. On 3 January 1967 *Valdez* started northwest along the eastern coast. After being examined to plan for overhaul in the U.S., she continued from Mombasa around the horn of Africa into the Red Sea, and on 30 March 1967 stopped at Massawa. There she took aboard VHF equipment for three positions and supplementary personnel for use particularly when she reached the Mediterranean Sea. After moving slowly along the Gulf of Suez and Suez Canal, the ship tarried for a few days in mid-April in the vicinity of Port Said. From 21 April to 22 May 1967 she moved about the Mediterranean, including an attempt to collect [redacted] On 23 May, at just about the time *Liberty* was being diverted into the Mediterranean, *Valdez* started across the Atlantic for major overhaul at Hoboken, N.J., where she arrived on 13 June 1967.

During the summer *Valdez* was thoroughly renovated. Working space was redesigned. The new equipment at positions was differently mounted to save deck space. The area for processing operations was enlarged. Accommodations for the Military Department was enhanced. When *Valdez* returned to sea on 11 September 1967, the onset of old age had been arrested by other work as well, and her Sigint unit received refresher training before she returned to the western coast of Africa on 7 October 1967.

Coverage of Latin America and Africa, 1966–1967

From 7 to 24 September 1966 *Belmont* cruised in the Caribbean, went through the Panama Canal and moved south as far as Ecuador before returning. *Belmont*'s In-

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formal Technical Notes drew attention to the adverse consequences of having insufficient processing resources on board. Being unable to identify targets positively when signals used a prescribed frequency and mode, the operators recorded material which was later processed at NSA and found to be from unwanted, unassigned transmissions. A processing capability would have prevented wasted time and effort, both on the ship and at Headquarters, NSA.

On 13 October 1966, USIB approved new guidance applicable to collection of Latin American (less Cuban) communications. The consumers were advised to bring their intelligence requirements into line by 1 December 1966. The new guidance required:

A. Increased reporting on internal communications (primarily related to dissident and anti-dissident activity) of Colombia, Dominican Republic, Ecuador, Guatemala, Haiti, Peru and Venezuela.

B. Significant reduction of reporting on other internal targets without losing "technical capability."

C. Emphasis on reporting [redacted] communications of Argentina, Brazil, Chile, Mexico, and Venezuela; and maintenance of the existing level on all others.

When *Liberty* was diverted from west African waters to the Mediterranean in May 1967, *Belmont,* after completely circumnavigating South America, shifted to take up *Liberty*'s former targets in Africa. On 14 August 1967, *Belmont* left Norfolk on what had been scheduled as a cruise of 16 weeks. When the civil war in Nigeria erupted, with the experience of *Liberty* in June so fresh in mind, *Belmont* was directed by COMSERVRON 8 to approach no closer than 100 miles from Nigeria. Emphasis then shifted to Congolese communications targets, and the schedule of port calls was changed. Before a renovated *Valdez* could return to Africa, the prospect of a Soviet space event caused *Belmont* to be diverted by direction of the JCS/JRS around the Cape of Good Hope into the Indian Ocean. A possible [redacted] test firing into the Indian Ocean added another reason for *Belmont*'s presence there.

AGER Plans Are Stymied in 1966

During 1966 while U.S.S. *Palm Beach* and U.S.S. *Pueblo* were being prepared for service in Phase II of the Navy's AGER program, the ships to be constructed for Phase III and others for an NSA plan waited for funding action. To accommodate desired features, the Navy vessels might have to be longer and faster and more expensive than *Banner.* An estimate of about $10,000,000 per ship encouraged caution in presenting a Navy Program Change Proposal for OSD Review. NSA wanted four other trawlers, ships resembling *Banner* in dimensions, organization and configuration, for use near Southeast Asia. Informal discussion indicated that the OSD Review Group would not approve them if they were to be used elsewhere than in the South China Sea and Gulf of Tonkin. Since the need for using them there was slight, NSA in 1966 decided not to seek supplemental FY67 funds for them.

The Navy's draft PCP at that stage called for 12 additional (and newly built) smaller ships, and for construction of three others to eventually replace the converted AGERs. Expenditure of $151,000,000 over a period of five years would be required for construction. Seven hundred more billets, in which 12 officers and 396 enlisted men would be the Sigint personnel, costing $2,700,000 for operations and maintenance, would be needed by FY72. But faced with a reduction in total authority to obligate in FY68, the Navy in October 1966 decided to withhold any such proposal.

NSA Sigint Trawler (AGER) Study

The NSA Panel that engaged from 1965 to 1968 in preparing a Sigint Trawler Study defined the platform under consideration as having an over-all length of about 180 feet, a ship's operating crew of 4 officers and 35–40 enlisted men, and a Sigint team of 1 officer and about 30 enlisted men. Sigint collection and communications equipments would be limited to about 35 racks. Although the Panel had the NSA Shipboard Sigint Systems Study on which to build, it encountered considerable difficulty, after establishing collection requirements, in determining the optimum variety of operating positions (including complete signal-flow paths from antennas to reporting outputs), the most appropriate number of each type of operating position, the comparative effectiveness of using one, or more than one, trawler to provide the requisite number of operating positions, and the most productive tracks to be followed in each area. Accordingly, without waiting for completion of all the needed analyses, the Panel submitted an interim report dated 1 April 1966.

The number of Sigint trawlers proposed for national Sigint operations ran from eight to eleven, depending upon the availability of an eighth TRS and of an uncertain number of destroyer escorts carrying Sigint collection teams in connection with Soviet missile tests.

The Navy trawler program for 15 small ships proposed to use them in five specified areas:

[redacted]/Okhotsk	3
Black Sea /Mediterranean	2
Barents/[redacted]Baltic/North Seas	4
Mid-Pacific	3
China Seas	3
	15

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The NSA Interim Trawler Study with its plans for up to 11 small ships differed from the Navy's draft PCP chiefly in its allocation of trawlers for operations in the Caribbean. By December 1966, the Trawler Study Panel expected final work on technical systems analysis to allow publication on 15 February 1967.

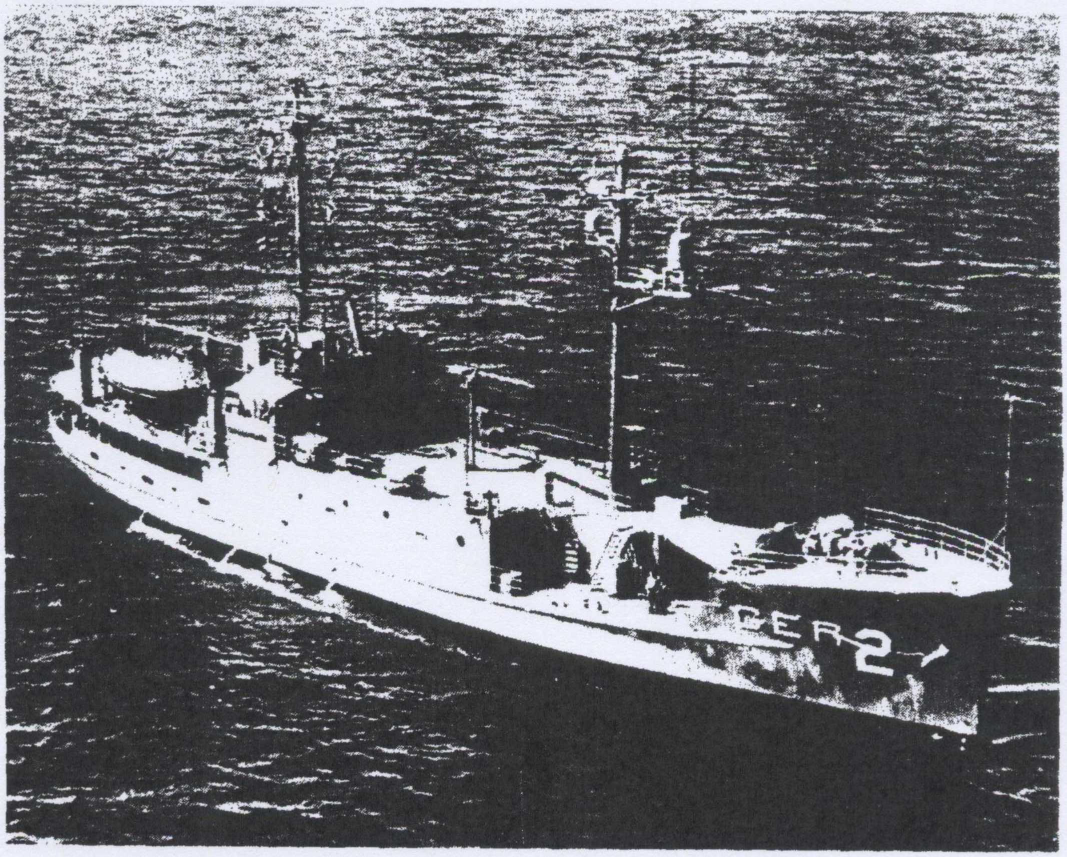
In April 1967, the Navy's proposal for AGERs was being revised to meet instructions by the Secretary of the Navy that it contain alternatives. As the planned size of the ships grew and as costs mounted with price inflation, constructing and configuring the 15 AGERs seemed likely to cost more than $200,000,000, and therefore to require a submission under DOD Directive 3200.9 as a "Concept Formulation," via the OSD. No more AKLs remained to be converted like *Banner, Pueblo* and *Palm Beach*. Converting minesweepers (MSFs) would cost an estimated $13,000,000 each.

Experience With The AGERs—Loss of U.S.S. Pueblo, 23 January 1968

Three AGERs were converted for the purposes of Integrated Intelligence Collection. U.S.S. *Banner* carried USN-467X (30 or less men) and made the first of twenty-one cruises (not including transit) in November 1965. On thirteen, of them she operated at various places in the [redacted] on seven, in the East China Sea. One brief mission took *Banner* into the Philippine Sea.

U.S.S. *Palm Beach*, with USN-466Y manning six positions, began observing Soviet fleet exercises in the [redacted] North Atlantic in May 1968. After returning to Norfolk in October 1968, the ship stayed there for about six months and then went to the Mediterranean. Her new Sigint unit was designated USN-430. After four cruises in the Eastern Mediterranean and one in the Western, she returned to Norfolk on 11 October 1969.

U.S.S. *Pueblo*, carrying USN-467Y, left San Diego on 6 November 1967. After crossing the Pacific Ocean to Yokosuka, she began her initial cruise on 5 January 1968 along the eastern coast of North Korea, intending to continue to the vicinity of Vladivostok. It was a track used successfully about one year earlier by *Banner*. Off



U.S.S. *Pueblo.*

Wonsan, *Pueblo* was attacked, boarded and captured in international waters on 23 January 1968. One man was fatally wounded, others were painfully wounded; all were held as prisoners. Sigint material was compromised.

The circumstances of the disaster, as in the case of the attack on U.S.S. *Liberty* seven months earlier, required investigations to answer some of the same questions. How had military command and control been exercised? Why was the ship in a hazardous area without adequate protection? Was the ship following orders when attacked? Did her Navy captain and crew adhere to the requirements of Navy practice? What Sigint material had been compromised?

Pueblo repeated what *Liberty* had demonstrated—that being in international waters was not sufficient protection for an inconspicuous shipboard platform; that characterization as a "spy ship" could weaken public support in the United States for retaliatory action; that the means of preserving the security of highly classified material in situations of danger were inadequate; and that the overstrain upon them required limiting classified material to what would be used on a specific cruise.

Soon the North Korean Communist government was exploiting its seizure of the *Pueblo* as fully as it could for making anti-American propaganda. They obtained, and broadcast, statements by the captive crew diverging from the conduct authorized for captured American servicemen. After more than one year, the North Koreans released the living members of the ship's company but neither *Pueblo* itself nor any of its contents at the time of capture were relinquished. The crew had not been treated as prisoners of war. Investigations of capture and cryptologic damage were completed with the benefit of testimony from the returned men.

Pueblo had been operating as a Navy direct-support ship under Navy operational control and Navy primary tasking. The mission had been initiated by CINCPACFLT, endorsed by CINCPAC, questioned concerning the high degree of risk by DIRNSA, but approved by the JCS/JRC. It had been executed almost wholly as a Navy operation under COMNAVFORJAPAN. For protection, those concerned had relied on the ship's legal immunity to search and seizure on the high seas, her avoidance of territorial waters, her passive role, her U.S. nationality, and the U.S. military force that might be deployed either to prevent or to retaliate against piracy. All but the last, the Korean Communists ignored. Against the last, they prepared. U.S. military power was unable to prevent the capture and was withheld from actions in reprisal.

At the time, AGERs engaged in direct support came under command and control in accordance with Item 13 of MJCS-506-67 ("Concept of Direct Support to Military Commanders"). In subsequent months, that document was supplemented by JCS-SM-701-68, dated 24 October 1968 ("Peacetime Reconnaissance and Special Operations Directive.")

Small Sigint Ship Program Languishes

The final version of the NSA Sigint Trawler (AGER) Study was ready when the Deputy Secretary of Defense (Mr. Cyrus Vance) on 1 March 1968 requested the comments of the Secretary of the Navy and the Director, NSA, on a letter by Dr. Fubini concerning the use of trawlers. A copy was sent to the Chief of Naval Operations on 8 March 1968 as perhaps being useful in preparing a reply, even if the report had been partly overtaken by events and NSA might have to alter some of the views expressed.

The document described the existing requirements that ships of that type could be used to satisfy, including coverage of Pacific space and missile events. The possible consequences of the loss of *Pueblo* had not been taken into account, nor had the prospect of having to transfer to shipboard platforms certain missions previously accomplished at land-based sites, stations that now seemed likely to be relinquished.

The findings of the study included a judgment that in certain geographical areas larger ships would do better than AGERs. The operations of *Banner* had demonstrated, the study said, that national Sigint collection, should, and could, be accomplished in conjunction with direct Sigint support and other intelligence objectives. NSA encouraged the Navy to submit an AGER program for meeting the Navy's needs for direct Sigint support, and for other intelligence, reconnaissance and research. But the report stated that the Navy and NSA would have to agree upon a concept of operations that ensured optimum accomplishment of objectives of concern to each. Any Navy/NSA AGER program should mesh with a future AGTR program, and both should be in harmony with other programs for mobile and covert collection.

DIRNSA steadfastly supported the need for several multi-sensor, small, intelligence-collection ships under Navy control, and for several SIGINT AGERs under DIRNSAs undelegated operational and technical control. When asked by CNO to appraise what had been accomplished during Phases I and II of the Navy's AGER Program, his reply was commendatory, and was forwarded for information to unified commanders.

From 1965 on, the OSD remained hesitant to proceed with the Navy's Phase III program for building 12 or 15 new trawler-type AGERs. When NSA had completed its Trawler Study the situation had not improved; the stringency of funds precluded any commitment to replace Technical Research Ships with AGERs as the former were deactivated, or to add new small ships for Sigint activities.

The cumulative consequences of the *Liberty* and *Pueblo* incidents were not helpful to any expansion of shipboard Sigint operations. The Sigint ships had to be protected by warships and combatant aircraft when near potentially hostile countries. The reduction in Navy appropriations forced elimination of many ships; if any combatant vessels had to be deleted, that would leave even fewer to protect intelligence ships. Given a choice, the Navy seemed to prefer combatant to intelligence ships.

Planning to replace or to supplement the larger Technical Research Ships by smaller AGERs—"Sigint Trawlers"—was overcome by various factors. Even a small ship was expensive to fit out and to operate as a seaboard collection platform. To deploy it in hazardous situations was to risk a heavy loss. To make less than full use of its Sigint capabilities in order to accomplish another purpose was extravagant. In the first two phases of the Navy program (the testing of *Banner, Palm Beach* and *Pueblo*) DIRNSA had agreed to delegate operational control over Sigint operations whenever an AGER was to be used in direct support of a fleet- or force-commanding officer. The CNO was free to advise DIRNSA when an AGER would be so needed, and when it would be available for primary national Sigint tasking. They alternated missions for about a year, and then direct support became usual; primary national tasking far less frequent. The desire to use small ships in close proximity to Soviet naval maneuvers, where they could collect photographic intelligence and use other sensors, involved risks which the Navy was more willing to accept than DIRNSA was.

NSA's Sigint Trawler (AGER) Study finally emerged at a time most unfortunate for its purposes, at a time when persistent efforts by the OSD to reduce the outlays required to execute the shipboard program ended by terminating it. The old TRSs were not to be supplemented by new small ships.

Chapter XI

The Shipboard Program is Sunk

The End of Primary Shipboard Sigint Operations

Between 1967 and 1969 provision of shipboard Sigint platforms for the long-run future suffered from many impediments. As we have seen, so much concern for acquiring small, trawler-type ships diverted some of the attention that might have been paid to procuring new Technical Research Ships. The Navy program for using the small ships in direct support disregarded the insistent "cost-effectiveness" approach by the Office of the Secretary of Defense to the procurement and utilization of expensive, scarce Sigint resources. Ship construction programs were therefore deferred.

While the old AGTRs were aging further and the three converted AGERs came into service, the possibility of additional conversions was investigated. No more AKLs could be obtained. Converting minesweepers would be so expensive as to make new construction preferable on economic grounds. A ship with characteristics like one of the Coast Guard types was favored, but for new construction, not for conversion.

NAVSECGRU was not the only organization that contracted with the MSTS for the conversion and use of old transports. Four Liberties being used as missile instrumentation ships were found to be scheduled for termination of such duties in December 1967 and January 1968. To make a Technical Reserach Ship out of one of them might be quicker and less expensive, it was then believed, than to start with an inactive hull. Of course they would be slow, and maintenance would involve problems similar to those of *Valdez* and *Muller*. U.S.N.S. *Kingsport* as a relief for *Oxford* or *Jamestown* was a latent possibility but was not converted to be a TRS.

While the policy of converting commissioned AGTRs into MSTS-chartered ships was in force, the program for modifying them complicated the question of how to compensate for the unavailability of the injured *Liberty* and the absorption of *Oxford* and *Jamestown* in Southeast Asian activities.

Liberty remained for several months a candidate for rehabilitation after returning to Norfolk in the summer of 1967. Only if electronic equipment to replace that destroyed in June could be found for her, could restoration of the hull be considered.

Funds could not be provided to convert the AGTRs to civilian operation under charter by the MSTS. Nor could funds be found for rehabilitating *Liberty*; in January 1968 the Navy started measures of inactivation and in February 1968 USN-855 was deleted from OPINS-20.

Funds for building, equipping and manning the AGERs for direct Sigint support under Subelement 43 of the CCP and for national tasking under Subelement 44 were deferred rather than denied while the NSA Sigint Trawler (AGER) Study was in progress. In order not to impede favorable action on the AGER program by the OSD the Navy avoided drawing attention to the TRS Development Study and its implications of heavy outlays for larger ships. After the annual AGER proposals had been passed over three times, the CNO on 29 February 1968 formally established Advanced Development Objective (ADO) 36-02X, "Technical Research Ship Signal Collection and Communications System Study."

The need to assess and to apply the experience with shipboard Sigint platforms in various studies sustained the OSD in postponing action on program proposals for execution during fiscal years 1966 to 1969. By 1969, the record showed how expensive shipboard collection already was, and the studies indicated how much more costly it might become. At the same time a new Federal administration was determined to reduce Government spending. In a few months the problem had changed from what kinds and numbers of ships should be provided to what platforms, if any, should remain active.

All efforts to acquire the best types of new Sigint ships, whether Technical Research Ships or small trawlers, were interrupted in 1969 by the decision to cancel AGTR/AGER shipboard collection. Although certain studies under Advanced Development Objective No. 36-02X then in progress were continued, the Department of Defense pruned great sums from the Navy budget.

(b)(1)
(b)(3) - P.L. 86-36
(b)(3)-50 USC 3024(i)

The cryptologic community and military departments reviewed the CCP for 1970 in detail and recommended to the Secretary of Defense ways in which the necessary amounts might be "saved." On 30 July 1969, after consideration and discussion, he agreed to recommendations cutting out $47,000,000. From the Department of the Navy, five Sigint ships would be taken out of service: the three Technical Research Ships, *Valdez*, *Muller*,[1] and *Georgetown*, which were likely to need the most money for renovation in a short time, and the two remaining AGERs. *Oxford* and *Jamestown* would remain in operation off South Vietnam, while *Belmont* took over *Muller's* mission on the Havana station. Released by that action would be 668 Navy and about 110 civilian personnel.

The Navy was subject to further reductions, and when the Deputy Secretary of Defense and Navy leaders conferred on 7 August 1969, the latter were inclined to drop *Oxford* and *Jamestown* too if the JCS could accept such an action.

The Navy was obliged to choose between combatant and intelligence ships for retention on the active list, and to recognize that some of the former would have to be available for protection of the latter. The ships to be inactivated were aging, slow, vulnerable to attack, and for those reasons (including the need to provide protective escorts on occasion) costly in proportion to their effectiveness. The recent limitations on their approach to foreign coasts rendered their collection far less valuable than when they could move in close enough to intercept low-powered VHF, and microwave signals. The ships seemed to Navy leaders marginal from the point of view of a Navy being severely reduced in order to cut expenditures.

Before going beyond the five-ship inactivation agreed to on 30 July 1969, the Deputy Secretary of Defense sought the views of others to be affected. Through the Joint Chiefs of Staff the unified commanders expressed a variety of opinions. USCINCEUR, for example, considered that the requirement of escorts in sensitive areas and a CPA of 50 miles from Syria, Israel, and Egypt lowered the value of shipboard collection, and that it was further weakened by tasking from the Director, NSA, instead of by a tactical Navy commander. Consequently, USCINCEUR preferred [redacted]CINCLANT considered that the high value of the work of the TRSs was more than offset by the costs and the burden of escorting them. They were too old to warrant retaining them in reserve. The other unified commanders, however, favored retention of one or more TRSs for contingencies.

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[redacted] CIA had no objections, on the other hand, to termination of the [redacted] by a TRS, but believed that one TRS should be kept available for contingencies.

NSA was quick to protest that the loss of the five ships, as well as the proposed cancellation of an airborne intercept (ACRP) effort, could not rightly be construed as "withdrawal of contingency capabilities." It would adversely affect the current Sigint mission. The minimum requirement for national Sigint production, as set forth in a reclama, was for three operating TRSs—one each for Cuba, the Mediterranean (while the Soviet Navy remained active there), and Southeast Asia (where a second ship would be advisable).

By that time, the Secretary of the Navy favored terminating all shipboard Sigint activities, but he dutifully responded to a request for estimates of how to meet a requirement for operating either one, two, or three TRSs. *Belmont*, *Jamestown* and *Georgetown*, in that order, he designated as the ones to retain. The annual costs, considering necessary repairs and maintenance, as well as operations, would be $842,000, $2,083,000, and $2,925,000 for the three possibilities.

On 1 October 1969, Deputy Secretary of Defense Packard informed the Service Secretaries, Chairman, JCS, and Director, NSA, that he had accepted the recommendation by the Secretary of the Navy to eliminate all the AGTRs and U.S.N.S. *Muller* rather than keep the earlier agreement of 30 July 1969 to retain in active service three of the AGTRs. He had concluded that no Sigint ships would be needed in order to satisfy national intelligence or military requirements.

For contingencies, however, shipboard collection might be needed. Instead of using AGTRs or AGERs, he requested that the JCS, in conjunction with NSA, prepare a plan for using [redacted] owned by the Military Departments.

While such planning began, the shipboard platforms were brought back to ports, stripped of their electronic gear, deprived of their Sigint and general service

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[1] The Navy began programming the funds for *Valdez* and *Muller* in FY 1968. Costs up to that time were as follows:

		Valdez	*Muller*
FY	1962	1,918,436	--------
	1963	1,514,763	2,105,797
	1964	1,158,802	1,150,325
	1965	1,143,068	1,052,407
	1966	1,212,894	1,141,395
	1967	1,356,112	1,305,038

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personnel, and inactivated.[2] The MUSSO documents applicable to them were cancelled. The last of the AGTRs to be decommissioned was *Belmont*, whose sister ship, *Liberty*, had been the first to go. In January 1970, shipboard Sigint platforms became a thing of the past.

Just at that stage of experience when new ships of advanced design and configuration might have been provided in numbers sufficient to satisfy requirements, the question became: "Can we afford them?" The men with the power of decision answered: "No."

Did their answer mean: "Not now?" Was the gate to be opened in the future when the costs could be borne? In 1970, the prospect seemed remote.

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[2] 30 Sep 1969, *Valdez*
31 Oct 1969, *Muller*
14 Nov 1969, *Banner*
02 Dec 1969, *Palm Beach*
19 Dec 1969, *Oxford, Georgetown, Jamestown*
Jan 1970, *Belmont*